THE IRON TRADE REVIEW

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Record Breaking Production and Shipments

By Many Mills—Blast Furnaces and Ore Vessels Also Make Good Showing

Record-breaking production and shipments, the tonnages in many cases being greater than for any month in five years, were made by mills during August, and the output of blast furnaces was also very heavy. Slow, but general advances of quotations on pig iron have continued. New orders which came to the mills during August were surprisingly heavy, being greater in the case of many companies than in July. Mills were under heavy pressure, and so great was the effort to turn out the greatest tonnage possible that Labor Day, particularly in eastern territory, received slight recognition. High ocean freights are interfering seriously with exports of finished materials.

Iron Ore

The sale of 35,000 tons of high grade Cuban ore, for next year's delivery, to an eastern Pennsylvania furnace at an advance of 50 cents a ton, emphasizes the upward tendency of prices of foreign and eastern ores. The probability is that the price of Lake Superior ores will be at least 50 cents a ton higher next year. Ore shippers not fully protected by contracts are having difficulty in moving ore and the offer of a Buffalo shipper of 10 cents' advance over present iron ore freight rates has not been accepted. Owing to the high freight rates prevailing on grain, it is not probable that lake vessels will be willing to haul ore unless furnaces offer considerably higher compensation. The heavy ore movement continues, August, with its shipment of about 7,800,000 tons, being the third month of the year in which the movement exceeded 7,000,000 tons.

Pig Iron Sales

Sales of pig iron during August were tremendous and some leading agencies disposed of the greatest tonnages of any month in their business experience. It is clear that many melters, having become convinced that a good time to buy has arrived, have covered for their requirements up to July 1, 1913, and it is probable that buying during the present month will not be as active as it was in August. Prices are still being advanced, but in a conservative way. In the New York territory, the principal buyer during the past week was the International Steam Pump Co., which, it is estimated, has purchased 25,000 tons of foundry grades recently. It is still in the market for 5,000 tons for two eastern plants. The buying of foundry iron in the Philadelphia district, which has not been as brisk as that for other grades, shows improvement, probably due to the fact that eastern Pennsylvania makers are now willing to quote more openly $16, furnace, for No. 2X for delivery during the first quarter of 1913. A Philadelphia stove company has bought 4,000 to 5,000 tons of foundry grades. A Delaware river pipe maker has purchased from 8,000 to 10,000 tons of standard forge. Southern iron is firm. Activity in steel-making irons has not been so great.

A St. Louis enameling company has closed for 10,000 tons of southern basic for first quarter at $13, Birmingham.

Structural Material

New structural projects have not come out very rapidly during the past week or so and delays in some cases are attributed to money conditions. Of about 6,500 tons awarded in the Chicago district, 90 per cent went to the American Bridge Co., including 3,000 tons for a bridge across the Arkansas river at Pine Bluff, Ark., and 1,600 tons for the Insurance Exchange building, San Francisco. The Upson Nut Co., Cleveland, is about to place 1,500 tons for a new office building and forge shop. This is the first work of new construction at the Upson plant, which will eventually be entirely rebuilt.

Finished Material

Makers of finished material experience no difficulty in obtaining premiums for prompt deliveries, especially on plates and shapes. Some contracts for steel bars have been made up to April 1, but makers of all kinds of finished materials are very cautious about entering into contracts for next year. The principal makers of cold-rolled shafting have advanced quotations $2 per ton. Makers of merchant iron pipe have announced advances of $2 per ton. The demand for tin plate shows considerable improvement and canning factories are placing large additional orders. Although the production for this year is expected to exceed that of any previous year, it will not be greater than the demand.

Coke and Old Material

Heavy purchases of melting steel have been made by eastern Pennsylvania steel makers and the market in other sections also shows improvement. The coke market is strong and prices are being well maintained, but the scarcity of coke predicted in some quarters has not developed.

PITTSBURGH

August Makes a Wonderful Record

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Sept. 3.

Shipments of iron and steel products last month were the heaviest since 1907, and with some mills all previous records were shattered. Another rather remarkable feature of the market, in this particular district at least, is the fact that new orders booked last month almost equalled those of July, which was considered the banner month of the year. Many of the leading manufacturers consider existing conditions the most wholesome that have been enjoyed for five years, although some, who are inclined to be more conservative, express the fear that buying may be restricted because of advanced price values, and it is claimed that much of the demand is abnormal in nature. Quiet buying has taken place the past week or 10 days, and rather smart advances in nearly all grades have been experienced. Much interest is manifested by consumers for next year's iron, but sellers are slow to consider such sales. Wire products have been quick to respond to advanced quotations, and tin plate shows indication of advancing in value in the near future. Several makers of iron pipe have issued new cards, showing advances of $2 a ton and steel pipe is expected to advance in value shortly. Cold rolled shafting is being quoted $2 higher than it was a week ago by some of the mills.

Pig Iron.—The pig iron market has showed renewed activity and advanced prices have been noted in Bessemer, foundry, basic and malleable grades, during the past week. There has been considerable quiet buying for this year's needs, and in the aggregate sales have been much heavier than reports indicate. Considerable interest is manifested by consumers in the 1913 market, and inquiries for first and second quarter delivery represent tonnages totaling about 50,000. Sellers, however, are hesitating about entering into contracts extending beyond the end of the present year, and as yet very little tonnage has been obtained for first or second quarter delivery. There has been good demand for Bessemer iron, and small tonnages at $15, valley, have been sold for this year's shipment. Foundry iron also has stiffened, and sales at $14.50, valley, are being reported. There is heavy demand for this iron, and it is believed $15, valley, will represent the future price. Malleable iron has developed added strength, and it is believed any tonnage of this stock could be obtained at less than $14.50, valley furnace, for shipment over the remainder of the year. Basic iron has been rather quiet, although it is generally conceded that there is no more $14 basic to be obtained. Gray forge, although not especially active, has sold as high as $13.70 valley, for shipment this year, and as high as $14, valley, was reported about a week ago. Many of the furnaces in this territory made record shipments last month. Stocks are low, and it would be difficult to obtain heavy tonnages of any grade. The average price of basic last month was $14, valley, and Bessemer iron sales averaged $14.534, according to figures provided by one of the sellers.

Quotations for prompt and future shipments are as follows:

(Prompt Shipment.)

Bessemer, valley	$14.75 to 15.00
Bessemer, Pittsburgh	15.65 to 15.90
Basic, valley	14.25
Basic, Pittsburgh	15.15
No. 2 foundry, Pittsburgh	15.15 to 15.40
Gray forge, Pittsburgh	14.50 to 14.60
Malleable, Pittsburgh	15.15 to 15.40

(Fourth Quarter.)

Bessemer, valley	$14.75 to 15.00
Bessemer, Pittsburgh	15.65 to 15.90
Basic, valley	14.25
Basic, Pittsburgh	15.15 to 15.40
No. 2 foundry, Pittsburgh	15.15
Gray forge, Pittsburgh	14.50 to 14.60
Malleable, Pittsburgh	15.15 to 15.40

Ferro-Alloys.—Ferro manganese is very scarce, and dealers are asking as high as $58, seaboard, for prompt shipment. For forward shipment $53.50, seaboard, is being asked by all the sellers, and within the past four or five days several small lots have been sold at this figure, for delivery in the first quarter. No change in the price of 50 per cent ferro-silicon has been noted, and it is still quoted at $72.50, Pittsburgh, for both prompt and forward shipment.

We quote 80 per cent ferro-manganese at $53 to $58, Baltimore, for prompt delivery and $53.50 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted nominally at $72.50, Pittsburgh, for prompt and forward delivery; 12 per cent, $22; 11 per cent, $21; 10 per cent, $20, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2 000 pounds.

Plates.—Mills making plates are at least three months deferred in shipments. August shipments were heavier than those of July, and new orders were fairly heavy. Although 1.35c is the quotation offered by the leading interest, very little tonnage is being booked, and all the other mills are asking 1.40c. Premiums of $2 and $3 a ton are being paid for prompt shipment. Car builders report that no large orders have been placed in this district, although many small contracts have been booked and represent fairly heavy tonnage. The Chicago, Burlington & Quincy railway is expected to enter the market shortly for between 1,000 and 2,000 gondolas. Plates for a new vessel for the Pittsburgh Steamship Co., involving about 1,800 tons, will be rolled by one of the mills in this district.

Plates are quoted as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.35c to 1.40c. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches 0.10c; circles, 0.20c. Plates in widths over, 100 inches up to 110 inches 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½ inch to and including 3-16-inch plate on thin edge, 0.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—Although it is reported that a rather heavy tonnage of sheets has been obtained in another territory for next year's consumption, at prevailing market prices, the leading interest and the most prominent independent sheet makers in this district report that they have not as yet entered tonnage for 1913 delivery. It is reported that one of the mills has been offered $3.20 for galvanized sheets, No. 28 gage, for delivery next year, but has declined to consider this quotation. Mills have been running at maximum capacity and it is reported that the output last month exceeded that of July, considered a

banner month by nearly all the sheet makers. Despite this fact, shipments are somewhat more deferred at present than they were early in August, and premiums continue to be paid where early delivery is assured. It has been reported that an advance of $1 a ton for all grades is being considered by leading sheet makers in this district.

The following quotations, which are very firm, continue:

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $1.70 per 100 pounds; Nos. 13-14 gage, $1.75; Nos. 15-16 gage, $1.80; Nos. 17-21 gage, $1.85; Nos. 22-24 gage, $1.90; Nos. 25-26 gage, $1.95; No. 27 gage, $2.00; No. 28 gage, $2.05; No. 29 gage, $2.10; No. 30 gage, $2.20.

Tin mill sizes, Nos. 15-16 gage, $1.80 per 100 pounds; Nos. 17-21, gage, $1.85; Nos. 22-24 gage, $1.90; Nos. 25-27 gage, $1.95; No. 28 gage, $2.00; Nos. 29-30 gage, $2.05; Nos. 30½-31 gage, $2.10; No. 32 gage, $2.15.

Blue Annealed.—Nos. 3-8, $1.45 per 100 pounds; Nos. 9-10, $1.50; Nos. 11-12, $1.55; Nos. 13-14, $1.60; Nos. 15-16, $1.70.

Galvanized.

Nos. 10-11 gage, $2.15 per 100 pounds; Nos. 12-14 gage, $2.25; Nos. 15-16 gage, $2.40; Nos. 17-21 gage, $2.55; Nos. 22-24 gage, $2.65; Nos. 25-26 gage, $2.85; No. 27 gage, $3.00; No. 28 gage, $3.15; No. 29 gage, $3.25; No. 30 gage, $3.45.

Roofing Sheets.

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate. — Within the past 10 days, there has been considerable new demand for tin plate, and rather heavy tonnages have been booked for can factories that need additional material on account of the unusually large crops. The output of the mills this year is expected to exceed that of any previous year and yet the supply does not equal the demand, making it impossible to accumulate stocks of any size. Effort has been made by consumers to obtain material for next year's shipment, and it is reported that some tonnage has been placed on the $3.60 base, although the leading interest and some of the independent mills are refusing to accept contracts extending beyond the end of the present year. One of the tin mills in this district has withdrawn the $3.50 base price, and is quoting $3.60. Other mills, it is predicted, soon will adopt the advanced quotation. Following are the revised quotations:

Coke tin plate, 100-pound basis, 14 x 20, $3.50 to $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Material. — The heaviest buyers of rails and track material are beginning to anticipate 1913 requirements, and a few of the roads have succeeded in placing small tonnages for next year's shipment, although active buying is not expected to begin until about the middle of this month. All the mills rolling rails in this territory have sufficient tonnage on their books to keep them operating at maximum capacity until the end of the year, and well into next year in some cases. The Carnegie Steel Co. is shipping both Bessemer and open-hearth rails abroad, and there has been fairly heavy demand for emergency work in this country. Makers of spikes have advanced quotations since the first of this month, and it is now believed impossible to obtain standard spikes at less than $1.75, and at least one of the important spike makers is asking $1.80. Spike shipments last month were heavier than those of July, and new orders were fairly heavy. Few of the mills can promise deliveries in less than three months.

A change in the price of spikes has been noted. Rails are quoted as follows, with the base price on open hearth sections 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds; 1.19c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.00c to 2.10c, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9-16	$1.75
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets. — A small sale of open-hearth billets at $25, Pittsburgh, has been reported, and one of the semi-finished steel makers has refused to shade this quotation. There has been some new demand for both billets and sheet bars, and deliveries are somewhat better than a week ago. Several days ago, one of the independent open-hearth sheet bar mills booked a small tonnage at $23, Pittsburgh.

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $22.50 to $23, with the usual extra for size and analysis, and open-hearth rolling billets, $23 to $23.50. Bessemer sheet and tin bars are quoted at $23.00 to $23.50, and open-hearth sheet bars are quoted $23.00 to $23.50, f. o. b. Pittsburgh and Youngstown for third quarter, with full freight to destination added. Forging billets are quoted at $28.00 to $29.50, Pittsburgh.

Hoops and Bands. — No difficulty has been experienced in obtaining 1.45c for steel hoops in carload lots, and one of the independent makers has sold a small lot at 1.50c. The leading interest, however, continues to quote hoops at 1.40c for car load lots, but is unable to promise delivery in less than a couple of months. Bands have been selling at 1.35c. Although 1.30c is the nominal quotation offered by the leading interest, little tonnage is being accepted. Quotations are as follows:

Hoops in carload lots, 1.40c to 1.45c, Pittsburgh; in less than carload lots, 1.45c to 1.50c; bands 1.30c to 1.35c; base, with net extras, as per standard steel.

Merchant Bars. — Notwithstanding that heaviest consumers of iron and steel bars covered estimated requirements earlier in the year, there has been rather heavy new demand within the past week, and it is reported that some of the independent mills have been able to obtain premiums amounting to $2 and $3 where it was possible to assure delivery within the next two or three weeks. Specifying last month was heavier than in July. It is reported that all consumers asked for the full extent of their contracts and in the majority of instances for additional tonnages. Most of the mills are three months or more deferred in shipments, and none of the bar makers is booking tonnages for next year's delivery. Any weakness that cold rolled shafting displayed several weeks ago has entirely disappeared, and it is now impossible to obtain tonnages at less than 64 per cent off for car load lots and 59 per cent off for less than car load lots.

In fact, one of the mills has withdrawn these quotations and is now asking 62 per cent off for car load lots and 57 per cent off for less than car load lots, which is equivalent to a $2 advance in values. Quotations are as follows:

Common iron bars, 1.40c to 1.45c, Pittsburgh; Bessemer and open-hearth steel bars, 1.30c to 1.35c; plow and cultivator, 1.30c to 1.35c, channels, angles, zees, tees, under 3 inch, 1.40c to 1.45c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds, 0.35. Cold rolled, and ground shafting, 64 per cent off in carloads and 59 per cent in less than carloads, delivered in base territory.

Muck Bar.—Very few sales of muck bar have been reported the past few weeks in this district, due to the fact that consumers covered requirements earlier in the year. The last tonnage of muck bar sold in this territory was at $30.50, Pittsburgh. Quotations for all grades of pig muck bar are nominally given at $30 and $31, Pittsburgh.

Bolts, Nuts and Rivets.—Last month was the banner month of the year for bolt, nut and rivet makers. Shipments

exceeded and new orders were equally as heavy as those of any other month. Jobbers, believing that another advance in values will take place, have been specifying heavily and have placed considerable new tonnage. We quote:

Rivets

Button head structural rivets, $1.80; cone head boiler rivets, $2.

Bolt and Nut Discounts

Carriage bolts, ¾ x 6 inches, smaller and shorter, cut threads, 75, 10 and 7½; larger and longer, 70, 10 and 5.

Machine bolts with hot pressed nuts; ⅜ x 4 inches, smaller and shorter, rolled, 75, 10, 10 and 7½; cut, 75, 10, 10 and 2½; larger and longer, 70, 10 and 10.

Gimlet and cone point lag or coach screws, 80 and 12½.

Hot pressed square, blank or tapped nuts, $6 off list; hot pressed hexagon blank or tapped, $6.70 off.

Cold pressed C. & T. square, blank or tapped, $6 off; hexagon, blank or tapped, ⅝-inch and larger, $7 off; smaller than ⅝-inch, $7.60 off.

Structural Shapes.—No large orders for fabricated steel have been placed in this district during the past week, although small bookings have aggregated rather heavy tonnages. Interest is being taken in an inquiry for 119 steel gates, involving 1,500 tons, for locks in the Mississippi river, near Keokuk, Ia.

The following prices are firm:

Beams and channels, 15 inches and under, zees, 1.35c to 1.40c; tees, 1.40c to 1.45c; angles, from 3 to 6 inches, 1.35c to 1.40c; over 6 inches, 1.45c to 1.50c; universal and sheared, 1.35c to 1.40c; over 15 inches, 1.40c to 1.45c; plates, 6¼ inches wide and wider, 1.40c to 1.45c.

Merchant Pipe.—Makers of both iron and steel pipe report that no large orders have been placed in this district for several weeks, and no important inquiries are pending at the present time. No complaint, however, is heard, as most of the mills are busy filling orders taken earlier in the year, and have sufficient tonnage on their books to keep them running at maximum capacity until the latter part of 1912. Shipments are being made to all parts of the country, and especially heavy tonnages are being sent to the oil fields in West Virginia and the southwest. Pipe makers have been unable to build up stocks on account of the demand, and warehouse stocks are low.

On Sept 1, the Youngstown Sheet & Tube Co. issued a new card on iron pipe, which provides an increase of $2 a ton. This list is practically the same as that of the other iron pipe makers, although one of the manufacturers is asking $1 a ton above the accompanying table.

Official discounts to jobbers, subject to the usual preferential discount to the large buyer, are as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Butt weld.			
	Black.	Galv.	Black.	Galv.
⅜, ¼ inch	72	52	..	..
⅛ inch	73	63	67	51
½ inch	76	66	70	57
¾ to 1½ inch	79	71	73	62
2 to 3 inches	80	73	74	63
	Lap weld.			
2 inches	77	70	70	61
2½ to 4 inches	79	72	72	63
4½ to 6 inches	78	70	71	63
7 to 12 inches	76	66	69	56
13 to 15 inches	53	..	..	..
Extra Strong, Plain Ends.				
	Butt weld.			
⅜, ¼, ⅛ inch	68	58	64	53
½ inch	73	67	68	61
¾ to 1½ inch	77	71	72	63
2 to 3 inches	78	72	73	64
Extra Strong, Plain Ends.				
	Lap weld.			
2 inches	74	68	67	61
2½ to 4 inches	76	70	71	64
4½ to 6 inches	75	69	70	65
7 to 8 inches	68	58	64	54
9 to 12 inches	63	53	59	48
Double Extra Strong, Plain Ends.				
	Butt weld.			
½ inch	63	57	58	50
¾ to 1½ inch	66	60	61	53
2 to 3 inches	68	62	63	55
Double Extra Strong Plain Ends.				
	Lap weld.			
2 inches	64	58	56	50
2½ to 4 inches	66	60	61	55
4½ to 6 inches	65	59	60	54
7 to 8 inches	58	48	53	43

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—Specifying against contracts for locomotive and merchant tubes has been heavy, and new demand for tubing has been active. Jobbers' stocks are low, and mills are urged for prompt shipment. Premium prices are frequently paid where early delivery is possible. Discounts on both products are being firmly held, and are as follows:

	Steel	Iron
1½ inch	59	47
1¾ to 2¼ inch	63	48
2½ inch	65½	53
2¾ to 3¼ inch	70½	55½
3½ to 4½ inch	73	58
5 and 6 inch	65½	48½
7 to 13 inch	63	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire.—New demand for wire products continues heavy—far beyond the normal demand for this season of the year. Mills have found no trouble in booking tonnage at the advanced quotation of $1.70, mentioned in last week's report. Official quotations are not being shaded in any instance, which indicates that the recent advance was justified. None of the mills has accepted contracts calling for delivery next year, and it is reported by some that such contracts will not be considered at prevailing quotations. Shipments last month were unusually heavy, consumers specifying to the limit of their contracts in all cases. The following quotations are being firmly held:

Wire nails, jobbers' carload lots, $1.70; retailers' carload lots, $1.75; cut nails (western makers), jobbers' lots, $1.65 to $1.70, painted barb wire, jobbers' carload lots, $1.70; retailers' carload lots, $1.75, with 30c for galvanizing; plain wire to jobbers in carloads, $1.56; and to dealers, in carloads, $1.50; polished staples, $1.70; galvanized staples, $2.00.

Wire Rods.—Most of the consumers of wire rods covered estimated needs several months ago, and there has been very little new demand for this product. A small tonnage of rods was sold a few days ago at $27, Pittsburgh, and it is claimed that this quotation soon will become the minimum. Bessemer and open-hearth rods are nominally quoted at $26 and $27, Pittsburgh, respectively.

Coke.—There is no change in the coke market. Prompt furnace coke continues to sell at $2.25 and $2.30, ovens, and no contract sales are reported. Foundry coke, in small lots, has sold as low as $2.50, ovens, for prompt delivery. Coke manufacturers seem to have overestimated needs of consumers, for the predicted coke famine has not yet occurred. Shortage of cars is expected to delay shipments, and consumers have been advised to anticipate requirements several weeks ahead. According to the Connellsville *Courier*, production of coke for the week ending Aug. 29, fell off 4,983 tons, as compared with the previous week, the decrease being almost equally divided between the furnace and merchant ovens. Shipments fell off 142 cars. The following quotations continue:

Connellsville	furnace	$2.25 to 2.30
Connellsville	furnace contract	2.25 to 2.35
Connellsville	foundry	2.60 to 2.75
Connellsville	foundry contract	2.60 to 2.75

Old Material.—Iron and steel scrap dealers are optimistic regarding the future market, although they report that is is impossible to obtain better than prevailing prices at the present time. It is reported that $14.25 has been paid for heavy melting steel by some of the mills in this district, although such sales have not been verified. Low phosphorus has been showing strength, and an early advance in value is predicted. Machine shop turnings have weakened, recent sales being between $10.50 and $10.75. We quote gross tons, delivered in the Pittsburgh district, including Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$13.75 to 14.00
Rerolling rails	14.25 to 14.50
Malleable	12.75 to 13.00
Bundled sheet scrap	12.25 to 12.50
Iron axles	23.00 to 24.00
Old iron rails	15.50 to 16.00
Stove plate	10.00 to 10.50
No. 1 wrought scrap	14.25 to 14.50
Old car wheels	14.00 to 14.50
Low phosphorus	16.25 to 16.50
Machine shop turnings	10.50 to 10.75
Cast borings	9.75 to 10.00
No. 1 cast scrap	13.25 to 13.50

CHICAGO

Demand Heavy---Opposition to Advancing Quotations

Office of THE IRON TRADE REVIEW, 1328 Monadnock Blk., Sept. 3.

The western producers continue in their discouraging attitude toward further price advances, although demand is much heavier and the total of specifications received during August is considerably in excess of that for any previous month. Some buyers in this territory are becoming insistent in their demands to be recognized for 1913 requirements, but the mills are firm in their refusal to consider contracts at this time. Prospects for a phenomenal amount of unfilled tonnage are becoming more pronounced daily and the leading interest will be unable to book any new tonnage in shapes for delivery during the first quarter, as consumers are taking out their entire contract tonnage in specifications. Consistent with the increasingly heavy demand on the warehouses, store material has advanced $1 a ton.

Pig Iron. — The demand for pig iron in this territory has developed into a pronounced buying movement and owing to differences in prices, the northern furnaces are obtaining the majority of the business. Northern iron is very firm on a basis of $16, local furnace, for first quarter delivery and strong Chicago interests have advanced their price for delivery during the remainder of the year to that figure. Such southern furnaces as are in the market for any appreciable tonnage are holding their iron at $13, Birmingham, for first quarter delivery and large interests name that price for the remainder of this year as well. The reluctance of the southern producers to meet competition of the northern furnaces in regard to price may be ascribed to the heavy sales made recently to southern consumers, which have materially decreased the southern iron available for this market. Moreover, the southern furnaces feel that prices will be higher and hence are not willing to take any appreciable amount of business even at $13, Birmingham. The demand for iron for first quarter delivery is increasing daily and sales of very large tonnages have been made. A melter in Sheboygan, Wis., has covered for 10,000 tons of No. 2 foundry at $16, the tonnage being distributed among furnaces in this territory. Other sales reported include two lots to northern Illinois melters of 2,000 tons each and one to a Wisconsin melter of 2,500 tons.

The following prices represent the market for Chicago delivery, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnace.

	Rest of year.	First quarter.
Lake Superior Charcoal	$16.75	$17.25
Northern foundry No. 2	15.50	16.00
Southern foundry No. 2	16.35	17.35
Southern Silv'res, 5 per cent sil.	17.40	.....
Jackson co. silv'r's 8 per cent.	18.90	.....
Malleable Bessemer	15.50	16.00
Alabama basic	16.35	.....

Billets.—Market conditions for billets remain practically unchanged and premiums continue to be paid for any material tonnages. Store prices represent the market more accurately than mill quotations, as the smaller lots can be obtained only from the former sources. In all probability, the finished situation will cause a continuance of these conditions far into the ensuing year. We quote, open-hearth forging billets, $30; rerolling billets, $27.

Merchant Bars.—Specifications for the past month for bar iron are considerably in excess of the total booked during any previous month of the year. The market is very firm at the present quotations and some business at 1.50c has been placed. The price of 1.40c can be obtained only on lots that are very desirable to producers. There is no change in quotations on steel bars and although the market is very firm at present prices, western producers continue to feel that the market should not be forced. Specifications for steel bars are on a par with those for iron bars and in some instances the mills are unable to take any additional business.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.40c to 1.45c, hard steel bars, rerolled, 1.35c to 1.40c; soft steel bars, bands and small shapes, 1.48c; hoops, 1.58c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 64 per cent off list for carload lots, 59 per cent off for less than carloads.

On iron and steel from local stock, we quote, as follows:

Bar iron, 1.85c per pound base; soft steel bars, 1.85c per pound base; soft steel hoops, 2.10c, full extras.

Structural Material. — The leading interest is refusing to quote on any new business in this territory either for the remainder of this year or for 1913. The western mills of the Corporation will be unable to book any new tonnage in shapes for first quarter delivery, as the consumers have taken out their entire contract tonnage in specifications and the unfilled tonnage carried over on the first of the year will tax the capacity of the mills until the latter part of March. Although they are having difficulty in placing new contracts owing to the inability of the mills to quote for future delivery, the position of the contractors in this territory is very strong and fabricating prices represent a good margin of profit. Even the smaller shops in this territory are well filled and the smaller contracts continue to be filled from store as far as possible. Store prices have advanced $1 a ton, and the jobbers are further behind on deliveries. The American Bridge Co. has taken 1,630 tons of structural material for the Insurance Exchange building, San Francisco.

We quote, mill prices, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.53c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $1.95 per 100 pounds; angles over 6 inches, $2.00 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.95 per 100 pounds, base; channels, 3 inches and larger, $1.95 per 100 pounds, base.

Rails and Track Fastenings. — Although inquiries for rails amounting to over 200,000 tons are in the market for 1913 delivery, no reliable information can be obtained as to the placing of contracts. Western roads are showing great interest in future requirements and are inquiring for large tonnages of track fastenings to be delivered throughout the first half of the coming year. Great difficulty is being experienced in obtaining deliveries on the latter material, as the mills are unable to take on business for the remainder of the year and are still refusing to take contracts for 1913 delivery. Prices are very firm

and further advances are expected. The Atchison, Topeka & Santa Fe is making inquiries for 40,000 tons of rails for 1913 delivery.

We quote, light rails, f. o. b. Chicago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.20c to 1.25c; 16 to 20-pound, 1.25c to 1.30c; 12-pound, 1.30c to 1.35c; 8-pound, 1.35c to 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section relaying rails, subject to inspection, $22 to $23.

Track fastenings, f. o. b. Joliet, angle bars, 1.50c; railroad spikes, 1.75c to 1.80c, smaller size spikes, 1.70c base; track bolts with square nuts, 2.10c to 2.15c, base.

Plates. — Specifications for plates continue unabated and western producers are practically out of the market. While some consumers are pressing their claims for 1913 delivery, no contracts have been taken, as the evidence of heavy unfilled tonnage for 1913 makes it difficult to estimate mill capacity for first quarter. A surprising feature of the situation is that there is no falling off in car building in spite of great activity in the past, and considerable additional business is pending. The Missouri, Kansas & Texas is in the market for 2,000 box cars and the Northern Pacific is inquiring for 2,500 center sills for 40-ton box cars. The Armour car lines will build 500 refrigerator cars at the company's shops at Chicago and the Kansas City Southern is in the market for 1,000 coal cars, 200 automobile cars and 100 ballast cars. The Canadian Pacific is also inquiring for 1,000 box cars, 20 baggage cars, 15 tourist cars and 10 first class coaches.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.53c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $1.95.

Sheets.—The sheet market is materially stronger and independent producers in the west are unable to quote prices for any new business. High premiums have been offered for early delivery, but owing to the maintenance of congested mill conditions such business cannot be placed. Warehouses in this district are enjoying a very heavy run of orders and the strength of their position is impaired only by their inability to promise certain delivery at any time, owing to increased shortages in many sizes. The jobbers are handling by far the larger part of the business in this material at present, as the mills continue to refuse contracts for 1913 and hence are out of the market.

We quote, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.10c; No. 12, 2.15c. Box annealed, No. 28, 2.50c. Galvanized No. 28, 3.60c.

For mill prices, see Pitsburgh report. Freight to Chicago, 18 cents.

Wire Products.—The advance of $1 per ton has had no effect on the demand for wire products and jobbers' requirements are increasingly heavy at the new quotations. Business in agricultural wire is very active for this season of the year and even greater tonnage in other grades is being placed.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.93, retailers' less than carload lots, $1.98; painted barb wire, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.03, with 30c for galvanizing; plain wire, jobbers' carload lots, $1.68; retailers' carload lots, $1.73.

Merchant Pipe and Tubes. — Although western makers have been able to make gains on the increasing demand in some instances there is no general improvement in the delivery situation, the producers being weeks behind. Present quotations are very strong and specifications of jobbers against future requirements are increasing.

We quote, store prices on merchant pipe and tubes, as follows:

Iron and Steel Pipe Basing Prices.

	Steel		Iron.	
	Black.	Galv.	Black.	Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	41.2
⅜ inch	73.2	62.2	67.2	51.2
½ inch to 1¼ inch.	76.2	67.2	70.2	58.2
Lap.				
2 inch	74.2	66.2	67.2	57.2
4½ inch to 6 inch..	75.2	66.2	58.2	59.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	66.2	55.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	59.2	47.2
½ inch	69.2	57.2	64.2	52.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	65.2	53.2
7 inch to 8 inch....	64.2	52.2	59.2	47.2
Double Extra Strong.				
Butt.				
¼ inch	57.2	45.2	....	....
½ inch to 1¼ inch.	60.2	49.2	....	....
Lap.				
2 inch	58.2	46.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	37	..	55½
1¼ to 2¼ inch.....	53	38	34
2½ to 3½ inch.....	63	48	44
3½ to 4½ inch.....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe. — Notwithstanding the increasing strength of the pig iron market, no further advances on cast iron pipe have been made. Routine inquiry for small tonnages is very active and some very desirable business is pending. The city of La Crosse, Wis., has invited bids on 1,600 tons of water pipe and the requirements of Akron, O., will call for 2,800 tons.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $30, 6 to 12 inches, $28, larger sizes, $27; gas pipe, $1 a ton higher.

Old Material.—The tendency of the scrap market is materially stronger. While there is a feeling of confidence in many quarters that the present high level will be maintained, the continued presence of adequate stocks in the hands of consumers acts against any great increase in prices. Dealers are well satisfied with the present situation, as it is thought that the strong position in finished lines will prevent any falling off in quotations. The present upward tendency of the market may be ascribed principally to the fact that the market was forced too high earlier in the year and followed by much lower quotations. The present prices are on a fair basis and consumers show no hesitancy in covering for their requirements, although reluctant to buy in any appreciable quantity at an advance. Railroad lists for the week are small, the largest items being fair tonnages of No. 1 railroad wrought and steel rails. A list has been issued by the St. Louis & San Francisco Railroad Co. for 669 tons of miscellaneous scrap, on which quotations close Thursday, Sept. 5.

We quote for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$13.25 to 13.75
Old iron rails	16.50 to 17.00
Rerolling rails (5 ft. and over)	14.25 to 14.75
Old steel rails (3 ft. and under)	12.50 to 13.00
Frogs, switches and guards	12.25 to 12.75
Heavy melting steel	12.25 to 12.75
Shoveling steel	12.00 to 12.50

Net Tons

No. 1 R. R. wrought	$12.50 to 13.00
No. 2 R. R. wrought	11.50 to 12.00
Arch bars and transoms	16.25 to 16.75
Knuckles, couplers and springs	12.00 to 12.50
Shafting	15.00 to 15.50
Iron car axles	20.50 to 21.00
Steel car axles	16.00 to 16.50
Locomotive tires	13.50 to 14.00
Dealers forge	9.75 to 10.25
Pipe and flues	9.50 to 9.75
No. 1 cast	11.75 to 12.25
No. 1 busheling	10.25 to 10.75
No. 2 busheling	7.50 to 8.00
No. 1 boiler cut	8.25 to 8.75
Boiler punchings	12.50 to 13.50
Cast and mixed boring	6.50 to 6.75
Machine shop turnings	7.50 to 8.00
Railroad malleable	12.25 to 12.75
Agricultural malleable	11.00 to 11.50
Angle bars, splices, etc., iron	14.25 to 14.75
Angle bars steel	11.25 to 11.75
Stove plate and light cast scrap	10.00 to 10.50

CLEVELAND

Heavy Ore Movement---Shafting Advances

Office of THE IRON TRADE REVIEW,
Penton Bldg., Sept. 3.

Iron Ore.—In spite of the very unfavorable weather which prevailed during a large part of August, the shipments for the month made a great record, August being the third month of the year in which the shipments have exceeded 7,000,000 tons. A number of ore shippers who had blocks of ore to move were unable to get vessels to take them at the season's rate, based on 40 cents net from the head of the lakes. The result was that, on Tuesday, a Buffalo shipper offered 60 cents, but this will not be attractive to vessels which are able to load with grain, on which the rate is equivalent to an ore rate of about 93 cents. Ore shippers will probably not be greatly embarrassed during the remainder of the season, as nearly all of them are well provided with contracts for the movement of their ore, but any furnaces not so covered which may blow in this winter will have difficulty in getting ore and moving it. Owing to the suspension of work at the docks Monday, on account of Labor Day, a couple of days will be required to work out carriers now waiting at Lake Erie docks. Owing to the heavy rains of the past few days, the water in the Cuyahoga is very high, and tugs have been unable to handle some of the larger carriers consigned to upper river furnaces.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $3.75; Mesabi Bessemer, $3.50; old range non-Bessemer, $3.00; Mesabi non-Bessemer, $2.85.

Pig Iron.—Sales agencies having furnaces in Ohio and adjoining states report tremendous tonnages of pig iron sold during August. The demand continues brisk and prices are tending upward. A goodly number of melters have covered for their requirements up to July 1. It does not seem probable that the extremely heavy buying of the past month will continue. For delivery during the first half of the year, Cleveland furnaces are quoting $15 at furnace for shipment outside of the city and $15 for iron delivered in the city. It seems probable that the latter quotation will be advanced 25 cents at an early date. For delivery during the remainder of this year and the first half of next year, we quote as follows, delivered in Cleveland, the lower quotation being for this year:

No. 1 foundry	$15.25 to 15.50
No. 2 foundry	14.75 to 15.00
No. 2 southern	16.35
Bessemer	15.65
Lake Superior charcoal	16.60
Jackson co. 8 per cent silvery.	18.05

Coke.—Shipments against contracts for foundry coke continue at a lively rate and prices are firm for both prompt and contract. We quote as follows, at the ovens:

Connellsville furnace coke, $2.25 to $2.30 for prompt delivery, and $2.25 to $2.35 on contract; Connellsville foundry coke, $2.60 to $2.75 for prompt, and $2.50 to $2.75 on contract.

Finished Material.—Sales agencies are devoting their energies almost exclusively to urging shipments from mills and are having much difficulty in shipping fast enough to satisfy consumers. The demand for steel bars is very strong. There are some consumers not getting enough steel to meet their requirements on contracts who will be compelled to buy a considerable tonnage for the remainder of the year and will probably be compelled to pay premiums. The shafting market is strong and an advance in prices of $2 per ton has been made. Some buyers are anxious to contract for bars, shapes and plates for delivery next year, but with the exception of some contracts on bars up to April 1, very little, if any, contracting is being done. Warehouses are extremely busy and are working overtime on shipments.

Bids for the high level bridge across the Cuyahoga, rejected last week, have been readvertised for Oct. 2. A new office building and forge shop to be erected by the Upson Nut Co., will require 1,500 tons of shapes. The Upson plant will in time be completely rebuilt.

Old Material.—Relaying rails were in tremendous demand during the past week. The inquiry has been good for several weeks, but has increased rapidly and dealers, who could not find a market for rails six months ago, are now unable to secure a supply sufficient to satisfy demands. A deadlock exists between dealers and buyers of No. 1 busheling, although some sales have been made at the revised figure of from $11.25 to $11.75. Dealers are optimistic over the market and are waiting until mills exhaust their supplies. Car conditions at the local mills are improving and within a week it is expected that the tracks will be cleared. The mills are still inquiring for steel making scrap for later shipment, but a spot sale has been made and with the car situation improved, advanced quotations are expected for immediat shipments. The demand for heavy cast is good, foundries buying freely.

The Wheeling & Lake Erie closed a list Sept. 2 and the Baltimore & Ohio closes a list today. The Erie will close a list Wednesday. We quote, f. o. b. Cleveland, as follows:

Gross Tons.

Old iron rails	$15.50 to 16.00
Old steel rails (under 6 ft.)	14.00 to 14.50
Old steel rails (over 6 ft.)	14.50 to 15.00
Relaying rails	20.00 to 20.50
Old car wheels	13.00 to 13.50
Old steel boiler plate	11.25 to 11.50
Malleable iron (railroad)	13.25 to 13.50
Steel axles	19.00 to 19.50
Axle turnings	10.50 to 11.00
Malleable iron (agricultural)	11.50 to 12.00
Heavy steel	13.00 to 13.25
Country mixed steel	11.50 to 12.00
Bundled sheet scrap	10.00 to 10.50

Net Tons.

No. 1 R. R. wrought	$12.50 to 13.00
No. 1 busheling	11.25 to 11.75
No. 1 machine cast	11.50 to 12.00
No. 1 dealers' wrought	11.00 to 11.50
Machine shop turnings	8.50 to 8.75
Pipes and flues	10.00 to 10.50
Wrought drillings	8.50 to 8.75
Cast borings	7.25 to 7.50
Stove plate	9.50 to 10.00
Wrought iron piling plate	14.50 to 15.00
Wrought iron arch bars	14.00 to 14.50

Takes Over Plant.—The Universal Swing Joint & Machine Co., Louisville, Ky., has completed its organization with the election of the following officers: B. J. Jansing, president; John Bridges, vice president and general manager; Ben L. Brunner, treasurer, and John H. Hile, secretary. The company is capitalized at $100,000, and has taken over the plant and other assets of the Kentucky Gear & Machine Works. G. W. Binder, who owned that concern, will probably be superintendent of the new company, though arrangements in that direction have not yet been completed.

CINCINNATI

Pig Iron Very Strong---Prices Gradually Advancing

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., Sept. 3.

Pig Iron.—While there is not at present such an active buying and selling movement in this territory as has been experienced during the past two weeks, the market is exceedingly strong, and prices are slowly, but gradually being advanced. Alabama pig iron is now quoted at $12.50, Birmingham, for No. 2 foundry, for delivery this year, and $13 for the first quarter of next year. There is still some southern iron, however, that is being offered at $12 for the last quarter, and $12.50 for the first quarter, Birmingham basis. Some of the larger producers are still practically out of the market and are not soliciting business even at quoted prices, as they predict a further advance before the first of the year. Southern Ohio iron is being held by most of the Hanging Rock producers at $14.50, Ironton, for the first half of next year, but one large furnace interest in that district has recently advanced its price to $15, Ironton. There has probably been more northern iron sold in this territory within the past three weeks than southern, but the tonnage contracted for of the latter has been fairly heavy. Lake Superior charcoal iron has been recently advanced 50 cents a ton, and Virginia No. 2X is quoted at $14.25, furnace, for 1913 delivery.

Recent sales include 1,200 tons of northern No. 2 foundry iron for January to June delivery, the selling price being $14.50, Ironton, and 4,000 tons of standard southern pipe iron, which went to an eastern consumer. A small sale of 300 tons of northern iron was also made at $14.50, Ironton.

Inquiries in the market at present include 1,500 tons of southern iron from a Michigan stove manufacturer, the delivery to extend into the first quarter; 600 tons of southern iron from a nearby southern user, for last quarter shipment; 1,500 tons of southern No. 2 and 900 tons of silvery, from central Ohio; 600 tons and 200 tons in separate lots for January to June delivery, from a Quincy, Ill., consumer; 1,500 tons of northern and southern grades, and 2,000 tons divided between southern No. 1 soft and northern iron, both from central Ohio, and both for 1913 delivery; 500 to 800 tons of northern No. 2 from southern Ohio, and 500 tons of northern No. 3 from central Ohio.

With freight rates $3.25 from Birmingham, and $1.20 from Ironton, we quote Cincinnati prices as follows:

Southern	foundry	No. 1	$15.75 to 16.50
Southern	foundry	No. 2	15.25 to 16.25
Southern	foundry	No. 3	14.75 to 15.25
Southern	foundry	No. 4	14.50 to 14.75
Southern	gray forge		14.25 to 14.50
Mottled			13.75 to 14.25
Southern	No. 1	soft	15.75 to 16.50
Southern	No. 2	soft	15.25 to 16.25
Standard	southern car wheel		25.50 to 25.75
Northern	No. 2	foundry	15.20 to 15.70
Northern	No. 3	foundry	14.70 to 15.20
Northern	No. 4	foundry	14.45 to 14.70
Jackson co. 8 per cent silicon			17.20 to 17.45

Coke.—The coke market has gained in strength during the past few days, but it is not as active as it should be in comparison with the number of inquiries, especially for furnace coke, that have been pending for some time. Prices on Connellsville furnace grades have been advanced in some instances, and several dealers here have been authorized to accept no business at less than $2.50, ovens, for furnace coke, and $2.75 for foundry coke. This same condition exists in practically all of the other fields, especially in the Wise county district. Some Pocahontas producers are showing a strong indifference as to whether they sell at the present prices or not, and are generally holding at the higher figures. The demand for foundry coke is very small, and not much business is expected along this line before the first of the year. A block of 6,000 tons of Pocahontas furnace coke was recently sold to a southern Ohio furnace, being only a part of its requirements. We quote below from the leading coke producing districts as follows:

		Prompt shipment.	Contract second half.
Connellsville district:			
Foundry	coke	$2.50 to 2.75	$2.50 to 2.75
Furnace	coke	2.25 to 2.50	2.25 to 2.50
Wise county district:			
Foundry	coke	$2.50 to 2.75	$2.50 to 2.75
Furnace	coke	2.25 to 2.50	2.25 to 2.50
Pocahontas district.			
Foundry	coke	$2.25 to 2.50	$2.25 to 2.50
Furnace	coke	2.25 to 2.50	2.00 to 2.50
New River:			
Foundry	coke	$2.50 to 3.00	$3.00 to 3.25
Furnace	coke	2.15 to 2.35	2.25 to 2.50

Finished Material — Several small sales of steel bars have been made at 1.35, Pittsburgh basis, but mostly on special lots with the delivery to be made within the next six or eight weeks. The generally quoted price is 1.30c, Pittsburgh. The market, however, is exceptionally strong, and most of the representatives of the larger mills state that they are practicaly out of the market on all new business, as they are now far behind on deliveries. Structurals are quoted by most dealers at 1.40c, Pittsburgh.

The local sheet mill is still doing a good business, and is now from six to eight weeks behind on deliveries. Specifications are coming in fast, and sales are being made at the recently advanced prices of 3.25c for galvanized sheets, No. 28, and 2.15c for black sheets, No. 28, both Pittsburgh basis. For other mill prices see Pittsburgh report.

Warehouse business is good and prices are strong with a tendency to rise. A local house recently received the contract for 1,200 tons of rivets for a large central Ohio car builder, which is one of the largest of its kind, closed in Cincinnati for a long time. We quote warehouse prices, f. o. b. Cincinnati, as follows:

Steel bars, 1.85c, base; iron bars, 1.80c, base; structurals, 2.05c, base; plates, ¼ inch and over, 2.05c base; sheets, blue annealed No. 10, 2.20c, base; rivets, cone head, 2.30c, base; cold rolled shafting, 58 per cent discount; boiler tubes as follows: 1¾ to 2¼ inch, 60 per cent discount; 2½ inch, 62 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 67 per cent discount; and 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2c; ⅝ inch square and larger, 2.10c; ½ inch square and larger, 2.20c; 5-16 to ⅜ inch square and larger, 2.40c; ¼ inch square and larger, 2.55c.

Old Material.—The scrap iron market is better than it has been for three or four weeks, and prices have been advanced slightly on several articles within the past few days. It is also showing more life, and a better buying movement, especially from rolling mills, is expected at any time. Heavy melting scrap is now quoted at from $10 to $10.50 per gross ton, and relaying rails are at from $20 to $20.75. A sale of a small tonnage of stove plate was recently made to a local dealer for $8 per net ton, while a good lot of cast borings was obtained from a local plant at $6.25 a ton. We quote below prices dealers will pay and also dealers' selling prices, as follows:

Gross Tons

Old iron rails	$12.25 to 13.00
Old steel rerolling	10.75 to 11.25
Old iron axles	17.25 to 17.75
Heavy melting scrap	10.00 to 10.50
Relaying rails	20.00 to 20.75
Bundled sheet scrap	7.50 to 8.00

Net Tons.

Old No. 1 R. R. wrought	$10.00 to 10.50
No. 1 machinery cast	10.50 to 11.00
No. 1 busheling	8.00 to 8.75
Stove plate	8.00 to 8.50
Machine shop turnings	6.25 to 6.75
Cast borings	6.25 to 6.75
Heavy turnings	6.75 to 7.25
Mixed cast	9.00 to 9.50
Malleable	7.00 to 7.50

PHILADELPHIA

Eastern Mills Working Under Pressure

Office of THE IRON TRADE REVIEW,
Philadelphia, Sept. 3.

The unusual pressure for deliveries under which eastern steel mills are working is emphasized by the cessation of but very few plants over Labor Day. The eastern steel makers find themselves still gradually losing ground in deliveries despite the harder driving of the mills. New tonnage continues to run freely and booked tonnage to accumulate. Premium payments are still fairly numerous. Pig iron continues very active and the market has been hardened by a more liberal contracting in foundry iron for which eastern Pennsylvania makers are now more freely quoting $16, furnace, for No. 2X for first quarter. A most important development as indicating the higher future costs of raw materials is the sale of 35,000 tons of Cuban iron ore for next year's delivery at 8 cents per unit, Philadelphia, an advance of approximately 50 cents over the year's delivery. Eastern steel makers continue to liberally buy heavy melting steel at advanced prices and the scrap market is strong.

Pig Iron.—General buying activity and advancing prices are still conspicuous in the eastern Pennsylvania district. The covering by buyers of forward requirements beyond Jan. 1 is now more apparent in foundry grades since up to this time eastern Pennsylvania producers have been feeling their way in offering metal of this class for first quarter. Numerous sales of Lehigh valley foundry grades aggregating a fair tonnage have now been made for first quarter delivery on the basis of $16, furnace, for No. 2X, and this is the level at which leading makers have fixed their schedule. A stove maker in this district has placed 4,000 to 5,000 tons of No. 2X and No. 2 plain for delivery this year and through first quarter. This order was distributed among several makers. For this year, $15.50, eastern Pennsylvania furnace, was done for No. 2X, and higher for beyond that delivery. A leading Lehigh valley maker has now advanced 25 cents for this year to $15.75, furnace, for No. 2X, and to $15.50 for No. 2 plain. Smaller foundries are now inquiring more freely. An eastern Pennsylvania radiator maker is out for 1,500 tons of No. 2X and No. 3 for first quarter. Central Pennsylvania makers are quoting $15, furnace, for first quarter, but show no great eagerness to take orders. One Delaware river pipe maker has bought freely the past week, taking 8,000 to 10,000 tons of standard forge for the year at about the quoted values. The usual price for standard forge for this year is $15, furnace. The leading Virginia maker has announced another advance of 25 cents for this year to $14.25, furnace, for No. 2X and the usual differentials for the lower grades. In steel-making iron, one eastern Pennsylvania steel-maker is inquiring for 2,000 tons of basic this year, 4,000 tons for first quarter and is also in the market for a lot of off-basic. It has been offering $15.75, delivered, for off-basic, which some makers are holding at $16, with $16.50, delivered, asked on regular basic for this year or first quarter. A Coatesville plate mill which has recently bought heavily is now fully covered on first quarter requirements. Standard low phosphorus iron is very strong at $21 to $21.50, Philadelphia. One lot of 3,000 tons remains under negotiation. Some small lots of malleable are pending in this district and makers are quoting $17.25, delivered, for first quarter. Lake Superior charcoal iron has again been advanced 50 cents to $16.50, Buffalo. Recent purchases of standard low phosphorus iron for forward delivery by a consumer in this district have reached 10,000 tons. This is in addition to some tonnage of Bessemer iron taken, as previously reported. We quote for prompt and last quarter shipment delivered to consumers' plants in Philadelphia and vicinity, as follows:

Eastern Pa. No. 1X foundry	$16.25 to 16.50
Eastern Pa. No. 2X foundry	16.00 to 16.25
Eastern Pa. No. 2 plain	15.70 to 16.00
Standard gray forge	15.50 to 15.75
Basic (Eastern and Central Pa.)	16.25
Virginia No. 2X	17.00 to 17.25
Southern No. 2	16.50 to 17.50
Standard low phosphorus	21.00 to 21.50
Malleable	16.70 to 16.90

(First Quarter.)

Basic (eastern and Central Pa.)	$16.50
Malleable	17.00 to 17.25
Eastern Pa. No. 2X foundry	16.70
Eastern Pa. No. 2 plain	16.45

Finished Material.—Such pressure is being put upon eastern mills that a number of them are running through the holiday this week. The demand for all materials continues with unabated strength and some makers are keeping up the record of new bookings in excess of capacity shipments. Practically all the eastern steel mills are running full and have accumulated tonnage for a number of weeks ahead. Some Philadelphia offices established new high sales records in August.

Eastern mills are still profiting from the sold-up condition of middle western plants whose deliveries are far extended. Buyers who regularly do not fill their needs in the east are being forced to apply to eastern Pennsylvania makers and they are freely paying advanced prices on premiums for particularly early shipment. Cases are to be noted within the week where consumers west of the Mississippi river paid plate makers 1.50c, eastern mill, for quick delivery. Stock shipments from structural mills, which usually mean about 10 days' delivery, are bringing 1.75c, mill. Large beams and 6 and 8-inch channels are in strong demand. Warehouse prices, Philadelphia, are around 2c for plates and shapes and 1.85c for steel bars. The regular schedules of prices with eastern mills remain 1.40c, Pittsburgh, or 1.55c, Philadelphia, for sheared plates and structural shapes and 1.45c for universal plates. New business in steel bars is not heavy, but this product is very strong at 1.30c, Pittsburgh, or 1.45c, Philadelphia. Bar iron is in better demand at 1.30c, eastern mill, with some plants asking higher. Bessemer billets have been sold by western mills in small lots at $25.50, Philadelphia. One eastern tin plate maker is inquiring for 3,000 tons of tin bars for the year and most makers are unable to quote.

In structural awards, the Belmont Iron Works has 700 tons for an addition to a power house at Scranton. Barber & Ross have 700 tons for addition to the Woodward & Lathrop store, Washington. A steel pier at Atlantic City, 1,300 tons, has gone over for a few days. The Garrett building, Baltimore, 500 tons, is still pending. The Pennsylvania railroad is inquiring for 200 tons of plate

girders additional for grade crossing work around Newark.

High ocean freights have practically rendered out of question exportation by eastern mills of finished products and recent inquiries, some of them of attractive size. Under present quotations, the prices quoted are prohibitive and these inquiries have become virtually inactive.

We quote, delivered at consumers' plants in Philadelphia and vicinity, as follows:

Plain structural shapes, 1.50c to 1.60c; tank plates, 1.50c to 1.60c; steel bars, 1.45c; common bar iron, 1.35c to 1.37½c; cut nails, 1.80c to 1.85c; blue annealed sheets, No. 10 gage, 1.65c to 1.70c; 4 x 4-inch open-hearth rolling billets, $24.90 to $25.50; forging billets, $29.40 to $30.40. Extras shown under Pittsburgh report. Philadelphia warehouse prices 1.85c for steel bars and 2.00c for plates and shapes.

Old Material.—Heavy purchases of melting steel by eastern Pennsylvania steel makers have further marked the scrap market during the past week. With but one or two exceptions all the leading eastern buyers have been in the market and have been closing around $14.50, delivered, or higher. On not an inconsiderable portion, $15, delivered, has been paid. Brokers at present are freely offering $14.50, delivered, and express themselves as being unwilling to sell out any tonnage lots below $15, delivered. One large eastern steel maker which has been duplexing recently and was supposed to be out of the scrap market indefinitely, has appeared unexpectedly with an inquiry for a round tonnage of steel. It is inferred from this action that this consumer regards the present market for steel cheap under ruling conditions. Other grades of scrap are stronger and are moving better, but the principal buying is in heavy steel.

We quote gross tons, delivered in consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (rerolling)	16.00 to 16.75
No. 1 heavy melting steel	14.50 to 15.00
Old car wheels	14.25 to 14.50
Old iron axles	24.00 to 25.00
Old steel axles	18.00 to 18.50
No. 1 railroad wrought	16.50 to 16.75
Wrought pipe	13.25 to 13.50
Cast borings	10.00 to 10.50
Machine shop turnings	11.00 to 11.50
Heavy cast	13.75 to 14.25
Malleable	12.50 to 13.00
Stove plate	10.75 to 11.25
No. 1 forge	12.75 to 13.25
Low phosphorus	17.50 to 18.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J., $1.10 to Pottsville, Pa.; Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

The Continental Radiator & Foundry Co., St. Louis, has increased its capital stock from $50,000 to $300,000.

BIRMINGHAM

Heavy New Sales Reduce Yard Stocks

Office of THE IRON TRADE REVIEW, Birmingham, Ala., Sept. 2.

Pig Iron.—The sales made in the past week against the local production involve an aggregate of some 25,000 tons of foundry grades, with one lot of 13,000 tons of standard basic. For the former, the prices received range from $12.50 per ton at Birmingham for No. 2 foundry, to $13 per ton at Birmingham for the same grade, even where delivery can be made promptly. All first quarter commitments made within the week are understood to have involved a $13 basis strictly, with a differential of 25 cents per ton for the low grades, while considerable tonnage of a favorite brand was sold at the same price for delivery in the remainder of the year. The tonnage of basic mentioned is understood to have been sold at $13 per ton at furnace, although the price consideration is not confirmed. As a whole, the market is considered decidedly stronger than at the time of last report, which is attributed to the strong demand that has followed the buying by the leading consuming interests, as well as the disposition to anticipate deliveries owing to the threatened car shortage. This last has affected delivery to a certain extent during the last half of the month, but from the reports so far in hand, the reduction in stocks during August is considerably more substantial than during July, in which the reduction in warrant holdings is quite a feature. At this time, at least four of the largest producers are quoting a basis of $13, at Birmingham, for delivery in the remainder of the year, and in the first quarter. In certain of these cases referred to, comparatively early deliveries only are solicited, while in others delivery prior to Jan. 1 is promised conditionally. A recent effort to secure 5,000 tons of No. 2 soft of a favorite brand for January shipment at $13 per ton was unsuccessful, and 1,000 tons of No. 2 foundry for spot export shipment have just been refused. One additional furnace has just been blown in, making a total of 14 stacks being operated on foundry iron, and one additional stack is now scheduled to go in blast about Oct. 1. The basic production has not been changed and is still represented by six active stacks. By reason of the recent heavy sales, the stock of this last has been practically depleted. With a tendency to advance, quotations on the several grades are revised as below, per gross ton, at Birmingham; although it is understood that in certain sections of the trade, those grades of a certain brand that are actually on hand can be had at a concession from the prices named.

Revised quotations are:

For delivery during the remainder of the year:

No. 1 foundry	$13.00 to 13.50
No. 2 foundry	12.50 to 13.00
No. 3 foundry	12.00 to 12.50
No. 4 foundry	11.50 to 12.00
Gray forge	11.00 to 11.50
Mottled	10.50 to 11.00
Standard basic	12.50 to 13.00
Off basic	11.00 to 11.50
Standard charcoal	22.50 to 23.00

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

Cast Iron Pipe.—Specifications for an additional 4,000 tons of water pipe for the requirement at Kansas City, Mo., have just been placed with two local producers, which was the largest transaction of the week. The small orders received are very attractive in the aggregate, and in such sales, the recent advance in quotations has been fully maintained. The price consideration for the tonnage mentioned above is not given out. Quotations on water pipe are as follows, per net ton, f. o. b. cars here, viz.: Four-inch, $24.50; 6-inch and up, $22.50, with $1 per ton extra for gas pipe. Special fittings are quotable at from $47.50 to $50 per net ton at foundry.

Old Material.—The sale of 850 tons of No. 1 wrought scrap has just been made at a slight advance over prices received in the week previous, which was the largest transaction reported. With a stronger pig iron market, dealers are more anxious to accumulate stocks, and recent receipts at local yards are very heavy. The inquiry for all grades is stronger than formerly, but in the absence of sales, prices cannot be revised with accuracy. We quote the following schedule as being asked by dealers for their holdings, per gross ton, f. o. b. cars here:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	12.00 to 12.50
Old iron rails	12.00 to 12.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.50 to 11.00
No. 1 country	8.50 to 9.00
No. 2 country	6.50 to 7.00
No. 1 machinery	9.00 to 9.50
No. 1 steel	9.50 to 10.00
Tram car wheels	8.50 to 9.00
Standard car wheels	10.50 to 11.00
Light cast and stove plate	7.00 to 7.50

NEW YORK

Next Year's Ore Sells at Advance

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Sept. 3.

Iron Ore.—A sale of 35,000 tons of El Cuero, Cuban ore, of second quality or Bessemer analysis, has been made for next year's delivery to an eastern Pennsylvania furnace at 8 cents per unit of iron, f. o. b. cars Philadelphia. This is the first sale of ore to be made in the east for next year's delivery and represents an advance of ¾ cent per unit or approximately 50 cents a ton over the price for this grade of material for last half shipment, which has been 7¼ cents per unit, Philadelphia. The sale is typical of the increased prices for which foreign and eastern ore sellers will hold for delivery after Jan. 1. El Cuero second quality or Bessemer ore analyzes 59 per cent or better, natural, in iron, and 0.025 per cent in phosphorus. Some additional purchases of Mesabi non-Bessemer ore for this year's delivery have been made by the eastern Pennsylvania interest which it is known considers this ore at the prevailing schedule to be exceptionally attractive. At $2.85, Buffalo, this ore figures about 6.7 cents per unit, delivered to the purchasing furnace.

Pig Iron. — The closing days of August saw a continuance of the heavy buying of pig iron which had prevailed in the metropolitan district during practically all that month, making that period one of notable importance not only in the tonnage booked, but in the date of the movement. Some sellers report having entered the heaviest volume of orders in any month for several years, which is quite a remarkable record for August. With the holiday break at the start, the new month starts off with a lighter new inquiry, but a considerable tonnage is still in the negotiation stage. As the furnaces continue to fill their books with orders, the advancing movement in prices is maintained. One large Buffalo interest which had sold liberally for first quarter around $15, furnace, for No. 2X, is now quoting $15.25, furnace, for No. 2X, $15.50, furnace, for 2½ to 3 per cent silicon and $15.75, furnace, for over 3 per cent silicon for first quarter. For this year, this seller has practically no tonnage to offer and is nominally quoting $15.50, furnace, for No. 2X. Other Buffalo makers are asking the $15.25 schedule for first quarter. The leading Virginia maker has again advanced 25 cents for this year's delivery to $14.25 for No. 2X, $14 for No. 2 plain and $13.75, for lower grades. One leading Lehigh Valley interest advanced in the week from $15.50 to $15.75, furnace, or $16.45, tidewater, for No. 2X iron for this year's shipment and is selling for first quarter at $16, for No. 2X. Other standard eastern Pennsylvania brands for first quarter are held at $16, furnace, and for this year the range is from $15.50 to $15.75, furnace. Central Pennsylvania 2X for first quarter is quoted at $15, furnace. Lake Superior charcoal iron for this year has again been advanced 50 cents to $16.50, Buffalo. The heaviest single buying in this market during the past week has continued to be by the International Steam Pump Co., which it is now estimated has purchased 25,000 tons or more during the recent movement for deliveries over the first half. About one half of this tonnage is for delivery in the Cincinnati and Milwaukee districts, but considerable of it has been for eastern plants. This business has been well distributed among eastern, western and southern makers. This buyer is still in the market for about 5,000 tons for eastern plants. A St. Louis maker of steel which was inquiring in the east for 10,000 tons of basic for delivery into next year, is understood to have closed this tonnage.

A New Jersey machinery builder took about 1,500 tons of No. 2 plain for this year at $15.25, eastern Pennsylvania furnace. A Connecticut hardware manufacturer closed for 500 tons of Buffalo No. 2X for delivery into next year at $15, furnace. Among the pending inquiries are 3,000 tons of No. 2X and 1,000 tons of malleable for deliveries running into first quarter for a Connecticut valve maker; 5,000 tons of basic for a railway equipment company for delivery this year to the Chicago district; 2,000 to 5,000 tons of low phosphorus iron for shipment this year and first quarter to a distant consumer; 1,800 tons of No. 2 plain and No. 2X to a New Jersey machinery builder for last quarter; 1,000 to 2,000 tons of No. 2X for a radiator manufacturer for this year's delivery to a New England plant. The General Electric Co. has now disposed of all the iron for which it was negotiating. Prices of No. 2X for New England shipment during this year and first quarter now rule from about $17.25 to $17.75, delivered. We quote for prompt and last quarter shipment at New York tidewater, as follows:

Northern foundry No. 1	$16.50 to 16.75
Northern No. 2X foundry	16.25 to 16.45
Northern No. 2 plain	15.75 to 16.20
No. 2 Virginia	17.25 to 17.50
No. 2 southern foundry	17.00 to 17.50
Malleable	16.50 to 16.75
Gray forge	15.50 to 15.75

Ferro-Alloys.—Sales of about 4,000 tons of ferro-manganese for shipment through next year have been made principally to middle western consumers at the new price of $53.50, Baltimore. On lots for delivery this year, $56, seaboard, has been done in carloads and one leading consumer is now asking $58 for such shipment. About 1,000 tons of inquiry is pending. The ferro-manganese market is very firm at the quoted prices. In 50 per cent ferro-silicon inquiry is chiefly in carloads, at which the market is strong around $72.50, Pittsburgh. We quote standard English 80 per cent ferro-manganese at from $56 to $58 for early shipment and at $53.50, seaboard for delivery after Jan. 1 and 50 per cent ferro-silicon at from $70 to $72.50, Pittsburgh.

Cast Iron Pipe.—One leading eastern maker of cast iron pipe has advanced its schedule on smaller sizes about 50 cents a ton, bringing its price for 6-inch to about $24, New York. The shop of this company is heavily booked with smaller pipe. Other makers are also advancing prices, though in a less marked way. Increased material costs, as well as the active demand, are elevating the market. The call for large sized pipe, however, is still only fair. Private consumers are buying freely and are already putting out inquiries for next year. Present indications point to two large high pressure lines for the metropolis coming out around Nov.

1, which it is estimated will require 30,000 to 40,000 tons. Present public lettings in the east are light. We quote 6-inch pipe at from $23 to $24, f. o. b. New York, in carload lots.

Finished Material.—The strength of the market in finished products continues to be manifested in the ability of sellers to command sharp price advances over regular schedules on occasional lots where delivery conditions are favorable to the buyer. Eastern makers are generally continuing to quote on a minimum of 1.40c, Pittsburgh, or 1.56c, New York, on plates and shapes for this year's delivery, but the heavily filled order books which are being maintained are making less and less the tonnage available for this period. One eastern Pennsylvania mill is now holding standard structural shapes at 1.50c, Pittsburgh, or 1.66c, New York, and is booking on this basis such tonnage as it has to offer. Eastern steel bar mills are well sold up and new business is not extensive. Lots of steel bars for this year have recently sold as high as 1.67c, eastern Pennsylvania mill. Bar iron is gaining strength at 1.30c and 1.35c, eastern mill. Semi-finished steel is very strong. Some adjustments of open-hearth sheet bar contracts for September have been made in the east as high as $25.50, Pittsburgh. Some leading eastern independents are expressing themselves as being unwilling to see the finished market advance further under existing conditions over the present general basis of 1.40c, Pittsburgh, for plates and shapes and 1.30c for steel bars.

The New York structural market is bringing forth only a moderate tonnage at present. Some leading fabricating interests predict that this condition will prevail until money rates are easier. The New York Central has placed about 400 tons with L. F. Shoemaker Co. for six small bridges on the Rome & Hudson division; the New York, New Haven & Hartford, 400 tons for additions to its Readville, Mass., shops to the Burlington Construction Co.; the Raleigh, Charleston & Southern, 260 tons of bridge work to the Phoenix Bridge Co., and the Baltimore & Ohio several additional signal bridges to the Mount Vernon Bridge Co. Other awards include 500 tons to Levering & Gerrigues for an apartment house at 103 West Seventy-fifth street, this city; 400 tons to the McClintic-Marshall Construction Co. for buildings for the Quigley Foundry & Machine Co., Chicopee Falls, Mass.; 550 tons to the West Side Structural Co. for the Samaritan hospital, Troy, N. Y. The Hinkle Iron Works is reported to have taken about 1,500 tons for two apartments for the Dungan Construction Co. at Wadsworth avenue and 172d street, this city. Bids are in and awards are about to be made on an apartment for the Elkan Realty Co., Eighty-fifth street and West End avenue, 1,200 tons; and on an apartment for the Hasco Building Co., also on West End avenue, about 700 tons. A garage for Mason & Seeman, on Forty-seventh street, 600 tons, is up for bids.

No definite announcements have yet been made of action taken upon the 141,000 tons of structural material for the Brooklyn Rapid Transit Co., upon which bids have been entered. We quote delivered at New York tidewater, as follows:

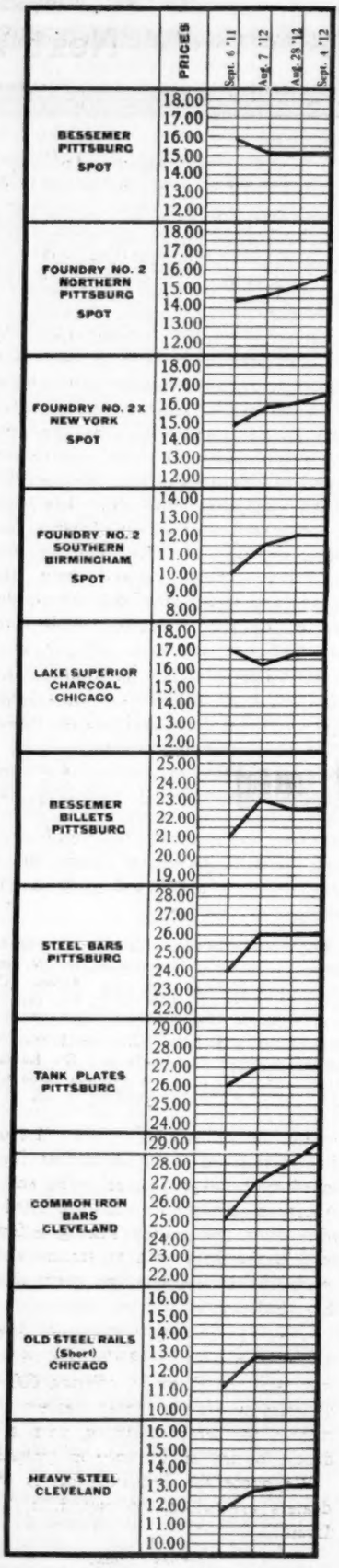
Plain structural shapes, 1.56c to 1.66c; tank plates, 1.65c to 1.61c; steel bars, 1.46c; common iron bars, 1.35c to 1.40c; steel bars from store, New York delivery, 1.90c; plates and shapes from store, 2.05c; extras as shown under Pittsburgh report.

Rails and Track Material. — The Harriman Lines have closed for about 17,000 tons of rails for this year's delivery with Steel Corporation mills. Included in this tonnage is a lot of 12,000 tons for the Southern Pacific which will be rolled by the Tennessee Coal, Iron & Railroad Co. at Ensley. The Lackawanna Steel Co. has received 5,000 tons of Northern Pacific rail order recently placed. The Pere Marquette Railroad is understood to have placed 8,000 to 9,000 tons of rails with a western Pennsylvania mill. The Cedar Rapids & Iowa City Railroad has placed 4,000 to 5,000 tons with the Illinois Steel Co. The Pennsylvania Steel Co. has taken about 1,500 tons for Cuba and Brazil. A Chicago seller is reported to have disposed of 10,000 kegs of railroad spikes for extended shipment at 1.75c, Pittsburgh.

Old Material.—Eastern steel mills which have been buying heavy melting steel freely around $14.50, delivered and in some cases, up to $15, delivered, are now less active in the market. Their offers at present fall short of the maximum prices paid in this movement. Other grades of scrap are moving fairly well except cast, which continues heavy. We quote gross tons, prices New York dealers will pay at tidewater, as follows:

Old car wheels	$11.75 to 12.00
Old iron axles	20.00 to 21.00
Steel axles	15.50 to 16.00
Old steel shafting	14.50 to 15.00
No. 1 heavy melting steel	12.25 to 12.75
No. 1 R. R. wrought	14.00 to 14.25
Wrought pipe	10.25 to 10.75
Cast borings	7.50 to 7.75
Machine shop turnings	8.50 to 8.75
Heavy cast	10.75 to 11.00
R. R. malleable	10.75 to 11.00

PRICE CHART



ST. LOUIS

Pig Iron Sales Make Good Tonnage

Office of THE IRON TRADE REVIEW,
St. Louis, Sept. 3.

Pig Iron.—Inquiries for pig iron in the St. Louis market include 10,000 tons of northern basic, 5,000 tons of northern basic, 3,000 tons of northern and southern, 1,000 tons of mixed grades, and scattering amounts, totaling 5,000 to 6,000 tons. Nearly all of it is for first half delivery.

Sales at Waterloo, Ia., aggregated 20,000 tons. All of this was northern iron, going to several concerns. The market is firm at $13 for southern No. 2, Birmingham basis, and at $17.50, delivered, for northern iron, for first quarter delivery. Several furnaces have notified their sales agents that they have sold up on southern iron for delivery over the remainder of 1912, and all local sales agents have received notice that all bids must be submitted before they become binding, even at $13 for first quarter shipment.

Our tabulated prices on southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$16.75 to 17.25
Southern No. 2	16.25 to 16.75
Southern No. 3	15.75 to 16.25
Southern No. 4	15.25 to 15.75

Coke.—Very few transactions in coke were reported last week, the inquiry today is small, and prices are unchanged as follows:

We quote 72-hour Connellsville foundry grades, $2.50 to $2.75 for immediate shipment or delivery through the year; 48-hour Connellsville furnace, $2.25 to $2.40; best 72-hour Virginia foundry, $2.50 to $2.75; 48-hour Virginia furnace, $2.00 to $2.40. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—The Missouri Pacific railroad is in the market for an indefinite tonnage of steel rails, and the American Bridge Co. has accepted an offer from the Granby Mining & Smelting Co. for 3,700 tons of structural material for a new smelting plant on the East Side.

Scrap Iron.—The Missouri Pacific is out with a list of 2,000 tons of scrap iron, and the Frisco is offering 600 tons of relaying rails to scrap dealers. The market for scrap is strong, with a tendency toward an advance in quotations.

We quote the following prices which dealers are willing to pay, f. o. b. St. Louis:

Gross Tons.

Old car wheels	$14.50 to 15.00
Old iron rails	15.25 to 15.50
Re-rolling rails (5 ft. and over)	12.50 to 13.00
Old steel rails (3 ft. and under)	11.50 to 12.00
Light section relayers (45 lb. and under) subject to inspec.	21.50 to 22.50
Relaying rails, subject to inspec.	23.00 to 23.50
Frogs, switches and guards	9.50 to 10.25
Heavy melting steel	11.00 to 11.50
Shoveling steel	9.75 to 10.25

Net Tons.

No. 1 railroad wrought	$11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Arch bars and transoms	13.25 to 13.50
Knuckles, couplers and springs	9.50 to 10.00
Shafting	13.00 to 13.50
Iron car axles	18.50 to 19.00
Steel car axles	16.50 to 17.00
Locomotive tires	10.50 to 11.00
No. 1 country wrought	9.00 to 9.50
Pipe and flues	8.00 to 8.50
Tank iron and cut boilers	8.00 to 8.50
No. 1 cut busheling	9.50 to 10.00
No. 2 cut busheling	8.50 to 9.00
Cast and mixed borings	6.75 to 7.25
Machine shop turnings	7.50 to 8.00
Railroad malleable	10.00 to 10.50
Agricultural, malleable	9.00 to 9.50
Stove plates	8.50 to 9.00
Angle splice bars (iron)	10.75 to 11.50
Angle splice bars (steel)	9.00 to 9.50

BUFFALO

Pig Iron Quotations Again Boosted

Office of THE IRON TRADE REVIEW,
Buffalo, Sept. 3.

Pig Iron.—The week ended with a total booking of 30,000 tons for delivery over the remainder of the year and into the first and second quarters of 1913, leaving still under negotiation close to 15,000 tons. Prices underwent a further advance—removing from the market any grades of iron under $15 and bringing the maximum of the range to the verge of $16 iron. Shipments continue to tax the capacities of the furnaces, being heavy, and the demand both urgent and steady. The buying producing the present practically sold up condition of the furnaces is being done quietly, the volume of business in no particular being like a boom. Furnaces are not only bordering upon being completely booked for the balance of the year, but a large percentage of the capacity of the stacks in this territory is also sold for first quarter delivery in 1913. Nothing is being closed for beyond the first half. In the face of the increased tonnage demands among the heavy melters—extending well into the next year, the sold up conditions among the furnaces, and the many large users still to come in with their requirements—the outlook from the producer's viewpoint is decidedly good. The range for the week, f. o. b. Buffalo, is:

No. 1X foundry	$15.50 to 15.75
No. 2X foundry	15.25 to 15.50
No. 2 plain	15.00 to 15.25
No. 3 foundry	15.00
Gray forge	15.00
Malleable	15.50 to 15.75
Basic	15.25 to 15.50
*Charcoal	16.50 to 18.00
*Some grades and brands	20.00

Old Material.—The activity of foundries, furnaces and mills has produced an improvement in the local scrap market situation, the demand growing stronger in all lines, both from here and outside the district. A general strengthening and rise of prices is reported for the week. Consumers now want to get under cover for extended deliveries at the prevailing prices but the dealers are not inclined to close except for immediate shipment orders. We quote the following f. o. b. Buffalo, in gross tons:

Heavy melting steel	13.50 to 14.00
No. 1 railroad wrought scrap	13.75 to 14.50
No. 1 R. R. and mch. cast sc'p	13.50 to 14.25
Old steel axles	15.75 to 16.50
Iron axles	22.50 to 23.00
Car wheels	13.75 to 14.25
Railroad malleable scrap	12.50 to 13.00
Wr'ght iron and soft steel turn.	8.25 to 8.75
Cast iron borings	7.75 to 8.25
Low phosphorus steel scrap	16.00 to 16.75
Old iron rails	15.25 to 15.75
Tank iron	10.25 to 10.50
Boiler plate, sheared	14.25 to 14.75
Pipe and tank	9.75 to 10.25
Stove plate	11.25 to 11.75
Sheet iron	7.25 to 7.75
Locomotive grate bars	11.25 to 11.50

Corporation Takes Over Scully Company

Chicago, Sept. 4. (By wire.)—The stock of the Scully Steel & Iron Co., the largest jobbing concern in Chicago, is now practically owned and controlled by the United States Steel Corporation. The transfer took place recently. During the last two years the Scully company has been dominated by the Corporation through a selling arrangement. The change in actual control involves no change in policy. The plant will probably be operated hereafter as a branch of the Illinois Steel Co.'s warehouse.

The National Car Co., of Hamilton, Ont., has secured an order from the Canadian Pacific railway for 1,500 cars of 80,000 pounds capacity.

METAL MARKETS

Heavy Pig Iron Buying Continued

Chicago

Aug. 31.

New Metals.—While some shading in the prices of new metals is evident, the market as a whole is very firm. Spelter and lead are much stronger, showing evidence of an increase in demand.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 17½c; casting, 17½c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 7.02½c; lead, desilverized, 4.82½c in 50-ton lots; corroding, 5.07½c; sheet zinc, 8.75c, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 47.44c; Cookson's antimony, 8⅝c; other grades, 7¾c.

Old Metals.—There is practically no change over conditions maintaining during the previous week, the demand for old metals being very good and present quotations represent a fair margin of profit to dealers.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 14½c; copper bottoms, 13½c; heavy red brass, 11¾c; heavy yellow brass, 9¼c; No. 1 red brass borings, 11½c; No. 1 yellow brass borings, 8¾c; brass clippings, 9¼c; lead pipe, 4c; zinc scrap, 5¼c; tea lead, 3¾c; No. 1 aluminum, 16c; No. 1 pewter, 30c; block tin pipe, 40c; tin foil, 37c; linotype dross, 3⅛c; electrotype dross, 3⅞c; stereotype plates, 4¼c; stereotype dross, 3⅛c; prime slab zinc dross, $100 a ton.

New York

Aug. 31.

Copper. — Electrolytic for October and November delivery is being sold by most producers at 17.75c, 30 days delivered, while some are asking 17.75c cash. Second sellers are asking 17.75c cash but the supplies in second hand are now quite scarce. Producers are not accepting any business in December copper as they expect an advance in the near future. The foreign demand continues satisfactory. Lake is selling at 17.75c cash and casting at 17.50c to 17.62½c. The close in London today was £78 18s 9d for spot and £79 7s 6d for three months, compared with £79 15s for spot and £79 17s 6d for three months a week ago. Copper exports during August were 29,526 tons.

Tin. — The great advance in the price of tin last week is believed to be due to the covering of shorts in the London market. If this is true, it is only a question of waiting till this covering is completed, when the market will undoubtedly break to somewhere near the former level. Today's London close was £216 15s for spot and £214 5s for three months, compared with £210 5s for spot and £209 for three months a week ago. The closing price in New York today was 47.75c, asked and 47.10c bid, compared with 46.50c asked last week. Considerable business in spot was done Saturday at 47.50c. Little is being done in futures. Tin arrivals since Sept. 1 are 940 tons and tin afloat is 2,110 tons. Deliveries into consumption in this country in August were 4,300 tons.

Lead. — The leading interest has fulfilled expectations by again advancing the price of lead to 4.85c. The independent sellers are asking about the same. The market, however, is quite dull as a result of the advance.

Spelter. — Prime western brands, New York delivery, are being held firmly at 7.25c to 7.30c. New business is small but deliveries are good.

Antimony. — Cookson's is held at 8.60c, Hallett's at 7.87½c, Hungarian at 7.75c and Chinese at 7.75c. The market is dull and colorless.

Rate Hearings Will Be Held

The Interstate Commerce Commission has set the dates for a number of important hearings on coke, coal, iron and steel rate complaints.

A hearing will be held at Birmingham, Ala., on Sept. 16, before Special Examiner Boyle, into the complaint filed by the Sloss-Sheffield Steel & Iron Co. and others, against the Louisville & Nashville and other railroads, involving the rate of $3.25 on pig iron from the Birmingham furnaces to Ohio river crossings. This rate was fixed in 1907, in accordance with the agreement made in 1887, when it was decided that the rate should fluctuate with the price of pig. Since 1907, when rates became rigid, the $3.25 rate has been kept in effect regardless of the price of pig.

One of the most important of all hearings will be held at Detroit, Sept. 23, before Special Examiner Gibson, into the matter of proposed new rules and regulations governing diversion, re-consignment and other privileges of coal, coke, iron ore and other related commodities handled by carriers at Detroit.

CHICAGO JOBBERS

Purchase Land and Will Build New Warehouses.

A. M. Castle & Co., iron and steel jobbers, Chicago, have purchased from heirs of Elizabeth M. McKay a tract of land on the north branch of the Chicago river, with an area of about 116,000 square feet, upon which they will erect several structures to be used for warehouse and office purposes. The site has a frontage of 350 feet and an irregular depth of 316 feet on the north and 370 feet on the south. It is served by the Chicago, Milwaukee & St. Paul railroad. The company proposes to build new docks equipped with cranes to facilitate the direct handling of steel from vessels and railroad cars. Two warehouses with a ground area of 80 x 200 feet will be erected on the north end of the property and a two-story office building, 65 x 100 feet, will occupy the remainder of the site. The company plans to concentrate the business of its various branches now located at 217-21 North Jefferson street and at the intersection of Morgan, Pratt and Superior streets.

Structural Contracts

Chicago, Sept. 3.—Out of a total of 6,418 tons awarded in structural contracts during the week, over 90 per cent was taken by the leading interest. This includes 3,000 tons taken for a bridge over the Arkansas river at Pine Bluff, Ark., 395 tons taken from the Elgin, Joliet & Eastern Railway Co. for shearing and punching plates, and 725 tons taken from the receivers for the Wabash Railroad Co., for 1,200 reinforcing frames. The same fabricator has also taken 1,629 tons for the Insurance Exchange building in San Francisco.

The record of production of the Steelton plant of the Pennsylvania Steel Co., for August, breaks all records for the year. Several of the mills smashed all records. During the past week, the open hearth made heavy outputs. All the furnaces at the new plant were in operation.

Large Increase Shown in Pig Iron Production

Gain of 97,111 Tons Was Made in August Over Preceding Month —17 Stacks Lighted, 13 of Them Operating on Merchant Iron

The marked increase in blast furnace activities is clearly indicated by the figures, just compiled, showing the total production of coke and anthracite pig iron in the country in August. The output last month was 2,499,678 tons, compared with 2,402,567 tons in July, an increase of 97,111 tons. The August total was the second highest for the current year, falling a few thousand tons behind May, but with that exception was the largest in 29 months, or since March, 1910. The gain was made despite the fact that several large stacks are out of blast for necessary repairs. The daily average production in August was 80,635 tons, against 77,502 tons in July, a daily gain last month of 3,133 tons.

AVERAGE DAILY PRODUCTION.

	1912.	1911.
January	66,220	56,989
February	72,372	63,617
March	77,791	69,863
April	79,254	68,163
May	80,753	60,367
June	81,125	59,109
July	77,502	57,294
August	80,635	61,995
September	.....	65,797
October	.....	67,486
November	.....	66,637
December	.....	65,558

By far the larger share of the gain in production was due to the increased activities of the merchant stacks. The total merchant iron produced in August was 631,386 tons, compared with 574,880 tons in July, a gain of 56,506 tons. The steel works, or non-merchant furnaces showed an increased output of 44,071 tons, producing 1,844,042 tons last month against 1,799,971 tons in July.

An unusually large number of furnaces was lighted last month, the number of stacks in blast on the last day of August being 255, compared with 245 active on the last day of July, making a net gain in the active list of 10. The gain was made entirely by the merchant stacks, 13 of which were relighted, while three were blown out, making a net gain of 10. Of the steel works, or non-merchant stacks last month, four were relighted, while an equal number were put out of blast, leaving the number active unchanged. In all, 17 stacks were relighted in August and seven were blown out.

MONTHLY PRODUCTION.

	1912.	1911.	1910.
January	2,352,806	1,766,658	2,599,995
February	2,098,796	1,781,285	2,428,937
March	2,411,529	2,165,764	2,588,736
April	2,377,621	2,044,904	2,477,700
May	2,503,341	1,871,388	2,374,802
June	2,433,737	1,773,282	2,288,279
July	2,402,567	1,776,108	2,158,124
August	2,499,678	1,921,832	2,103,791
September	.....	1,973,918	2,048,461
October	.....	2,092,061	2,086,205
November	.....	1,999,100	1,910,385
December	.....	2,032,301	1,779,899
Total	18,780,075	23,198,601	26,845,314

The production of spiegel in August was 10,317 tons, compared with 14,135 tons in July, a net loss of 3,818 tons last month. The total output of ferro was 13,933 tons, against 13,581 tons in July, making a net gain of 352 tons in August.

Blast Furnace Notes

The Brier Hill Steel Co., Youngstown, O., blew in its Grace stack last month, putting both of its furnaces on the active list.

The Belfont stack of the Belfont Iron Works Co., Ironton, O., was put out of blast Aug. 26.

One of the Isabella stacks of the Carnegie Steel Co., was blown out Aug. 19, while one of the furnaces at South Sharon, Pa., was blown out Aug. 30.

Riverside furnace No. 1, of the National Tube Co., was lighted on Aug. 1, both of the stacks at that place being now in blast.

"G" furnace of the Bethlehem Steel Co., South Bethlehem, Pa., was blown out Aug. 27, five of the six stacks being active on the last day of August.

The second Bird Coleman furnace of the Lackawanna Iron & Steel Co., was lighted on Aug. 5.

The Napier stack of the Napier Iron Co., Nashville, Tenn., was blown out for repairs on Aug. 21, but has resumed operations.

The Princess furnace of the Princess Furnace Co., Glen Wilton, Va., was badly damaged Sept. 1, when an explosion blew the top off.

The Virginia Iron, Coal & Coke Co., Roanoke, Va., blew in its Crozer No. 1 stack Aug. 8, placing both Crozer furnaces on the active list.

The Tonawanda Iron & Steel Co., North Tonawanda, N. Y., expects to blow in its two Niagara stacks during October.

Union furnace of Rogers, Brown & Co., Cincinnati, O., will blow in on basic, malleable and car-wheel iron about Sept. 15.

Crane furnace No. 2, of the Empire Steel & Iron Co., Catasauqua, Pa., was lighted on Aug. 20, placing two of the three Catasauqua furnaces on the active list.

The Wellston Steel & Iron Co., Wellston, O., will blow in its second stack within a few days, and is putting its Milton stack in shape for operation. Hall furnace of the Republic Iron & Steel Co., at Sharon, Pa., is being prepared for the torch.

AUGUST PIG IRON.

States.	No. of stacks.	No. in blast last day of month.		Total tonnage made.		——Totals——	
		Aug.	July.	Merchant.	Non-Merchant.	Aug.	July.
Pennsylvania	158	107	103	175,588	855,541	1,031,129	1,006,296
Ohio	71	52	49	161,739	406,808	568,547	523,966
Alabama	45	19	19	101,659	53,837	155,496	147,404
Virginia	24	6	6	20,403	.....	20,403	18,373
New York	26	17	17	63,664	108,402	172,066	170,725
New Jersey	7	1	1	5,519	.....	5,519	5,309
Illinois	26	20	19	33,948	217,674	251,622	243,203
Colorado	6	3	3				
Indiana	10	10	10				
Maryland	4	2	2				
Wisconsin	6	3	2	13,837	176,741	190,578	185,735
Kentucky	7	1	1				
West Virginia	4	3	2				
Tennessee	18	7	8				
Washington	1	.	.	27,060	25,039	52,099	48,696
Georgia	2	.	.				
Texas	3	.	.				
Minnesota	1	1	1				
Michigan	3	3	2				
Missouri	1	.	.	27,969	.....	27,969	25,174
Spiegel—All states..						10,317	14,135
Ferro—All states...						13,933	13,581
Totals	423	255	245	631,386	1,844,042	2,499,678	2,402,567

Greatest Gathering of Testing Engineers

Opening of Sixth International Congress at New York — Rail Steel Discussed

New York, Sept. 4. (By wire.)—So large an assemblage of renowned testing engineers and metallurgists never before has gathered, as is in attendance at the sixth congress of the International Association for Testing Materials, which convened yesterday in the auditorium of the Engineering Societies building. Every civilized country is represented, the delegations from Russia and Germany being notably large.

National, state and municipal recognition was accorded the congress at the opening session. Addresses of welcome were delivered by Gen. William H. Bixby, chief of engineers, United States army, on behalf of President Taft; by John A. Dix, governor of the state of New York, and by William A. Prendergast, controller, on behalf of Mayor Gaynor, of New York City.

Dr. Henry M. Howe, acting president, presided. The first note of welcome was sounded by Capt. Robt. W. Hunt, president of the American Society for Testing Materials. He was followed by General Bixby, who spoke in English, German and French with equal facility. Dr. Howe likewise delivered sections of his able address in a number of foreign languages, and the delegates who are unable to understand English, frequently showed their appreciation of Dr. Howe's lapse into their mother tongues.

Function of Testing Engineer

The function of the testing engineer was clearly defined by Dr. Howe as follows:

"Our purpose is to serve humanity by enabling it to distinguish the fit from the unfit among the materials with which the world's work is done, the materials for its buildings, its bridges, its ships, its railroads, its machinery and its construction in general. The testing engineer stands between the public and the manufacturer who would supply that public, to test the fitness of those supplies, to measure accurately their degree of fitness, and to reject unsparingly the unfit. He is a guardian of the lives of those who travel by land or sea, and of those who live or work in buildings of important size. He is a protector of the material interests of the public. It is to make this work of the testing engineer more effective, to guard the lives and the interests of the public the better, that this association exists."

Referring to international specifications for materials, Dr. Howe said:

"An important phase of our work is the unification of the method of testing throughout the world to the end that the buyer may the more readily and the more justly weigh the relative merits of all competing materials for every given kind, from whatever country they may come. The day has passed when the buyer's ignorance, his inability to ascertain for himself the fitness of what is offered him, forced him to rely on the reputation and on the assurances of manufacturer or exporter. Today he relies not on the untested assertions of the seller, however credible, but on his own tests or on test made by his agents. Purchase is no longer a matter of faith, but of knowledge."

Since the last congress of the association was held at Copenhagen three years ago, four additional countries are represented in the council of the organization, Japan, China, Canada and Brazil, thus increasing the number of countries represented in the council to 25. The membership has increased from 2,160 to 2,680, or by 24 per cent, and now represents 30 countries and every continent. Adding the members for the present congress year, the enrollment aggregates about 3,700. In addition to the existing national societies closely affiliated with the international body in Germany, America, Italy, Austria and Hungary, two new national societies have been formed in Russia and one in Switzerland.

An Interminable Program

The formal program which has been prepared is almost interminable, as it involves the presentation of 153 papers and reports, a total which greatly exceeds that prepared for any technical body heretofore. The work has been divided into three sections: A, metals; B, cement, stone and concrete; C, wood, oil, bitumen, rubber and other materials. The three sections will meet simultaneously throughout the week and abstracts of the papers and reports with their ensuing discussion are presented in English, German and French. Considerable delay is occasioned by the repetition in three languages and at this writing it seems almost impossible to transact all of the work planned.

The first meeting of section A, held yesterday afternoon, was devoted almost entirely to the consideration of papers and reports on methods for testing steel. Two papers on slag enclosures in steel elicited considerable interesting discussion and developed the fact that one large steel manufacturer has conducted extensive experiments with the electric furnace with a view to eliminating the non-metallic impurities which are deleterious in their effect and result in broken rails and fractures of other sections.

Dr. C. R. Richards, of Lehigh University, in discussing the papers on slag enclosures divided these into three classes; slag enclosures, oxide enclosures and mattes. He stated that the finer the sub-division of the non-metallic impurity in steel, the more deleterious or dangerous is its effect. He added, furthermore, that the dissemination of oxides is greatly increased by alloy additions.

Dr. Richards compared steel to muddy water or an emulsion of oil and water in which no separation of the impurities or of the oil and water can be effected except by permitting the solution to rest. This likewise applies to steel, and to effect a separation of the impurities from the steel it should be permitted to rest. For this reason some steel producers permit the steel to stand in the ladle as long as possible before casting. Frequently casting the steel into crucibles and holding it for a dead melt has been resorted to, but this practice is impossible where a large tonnage of steel is handled. The latest practice is to heat the steel in an electric furnace from one-half to one hour, where it is permitted to keep quiet and rest. The cost of this extra operation averages from 25 to 50 cents a ton. Dr. Richards concluded by stating that all good steel in the future will be put through the electric furnace for this quieting operation and for facilitating a separation of the impurities.

The American Steel & Wire Co., on Sept. 2, opened a large four-story and basement warehouse in Buffalo, at 337 Washington street.

The Works of the Bridgeport Screw Co.

In the design of the new plant of the Bridgeport Screw Co., Bridgeport, Conn., and in the arrangement of its various departments, the prime considerations were effective and economical methods of manufacture. The welfare of the employes also was taken into account and the lighting and ventilating facilities, together with the sanitary arrangements are all that could be desired. W. H. Farrell, president of the Bridgeport Screw Co., who laid out and supervised the construction of these works, has been prominently engaged in steel manufacture in this country and Canada for many years and has had charge of the construction or rebuilding of seven different plants. His wide experience with tonnage production has given him a thorough appreciation of the economies to be gained in manufacturing operations by the mechanical handling of materials. It was Mr. Farrell's judgment that the methods which have proved so profitable in steel manufacture could be applied, on a modified scale, to the production of smaller articles. In the arrangement of this plant, which is devoted to the manufacture of screws, the departments were laid out with a view to effecting economies by proper handling and dispatching materials through the successive manufacturing operations comparable, on a smaller scale, to those effected in modern steel mill operations.

The plant is 70 x 300 feet, two stories high and a two-story ell at one end is 50 feet square. Being located on the main line of the New York, New Haven & Hartford railroad, adequate shipping facilities are provided. A side track parallels a loading platform at the side of the building, to which access is had through three large doors from the store and shipping rooms. The site comprises about 3½ acres and the output averages 7,000 gross of wood screws daily. Additional equipment recently has been purchased and when installed the capacity of the plant will be increased to 14,000 gross daily, or approximately 4,000,000 gross annually. Machine screw products later will form a part of the output. The building is of brick and reinforced concrete construction. The walls are built of brick, while the columns, floor beams, stairways, etc., are of reinforced concrete. Every effort has been made to reduce the fire hazard and to prevent the spreading of the fire through the stairway shaft. The openings onto the stairway on the first floor are protected by

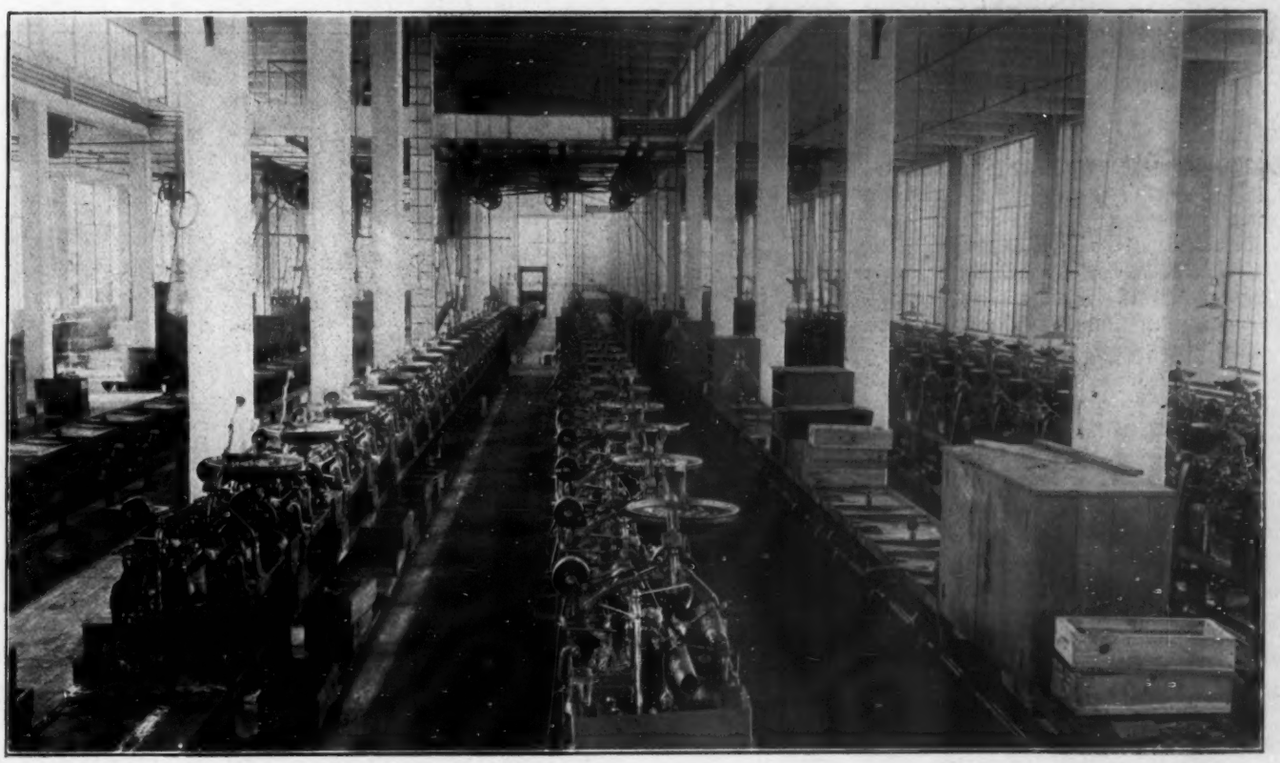


FIG. 1—GROUPS OF AUTOMATIC SLOTTING AND THREADING MACHINES

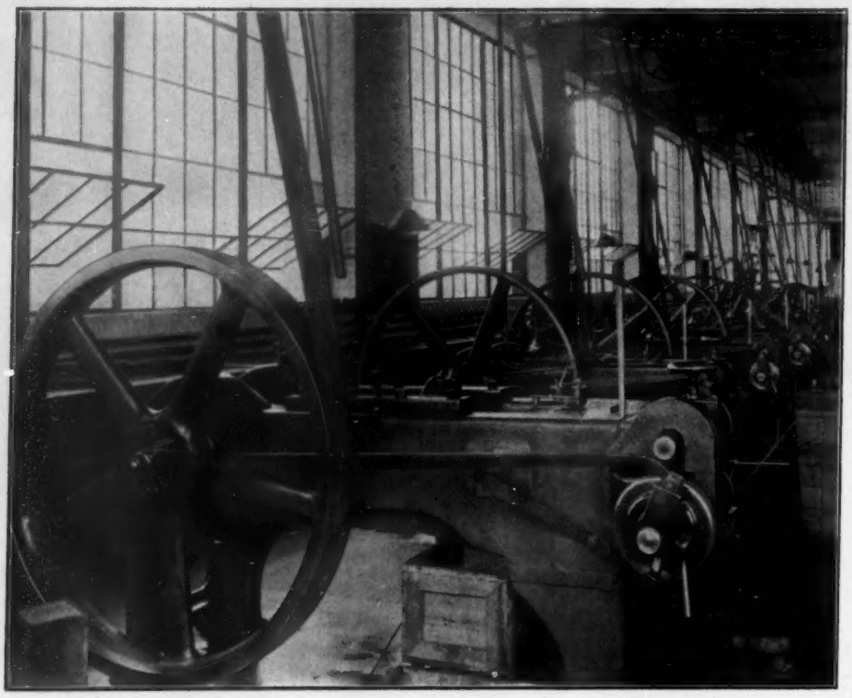


FIG. 2—AUTOMATIC HEADING MACHINES

heavy metal doors which are held open by a wire stretched across the frame at the top. To this wire a chain is attached from which a weight is suspended. The chain passes over a pulley and when the weight is released the door closes automatically. In one section of the wire attached to the chain is a soft metal fuse which requires only a low temperature to melt and this results in the parting of the wire strands. The practical value of this device, together with the other fire-proofing features, is reflected by the low insurance rate applied to these works by the board of fire underwriters.

In healthful and pleasant working conditions the plant is more than well fortified. A striking feature of the layout is the thorough attention that has been paid to the lighting and ventilating arrangements. The large amount of window space not only floods the manufacturing departments with light, but provides, as nearly as possible within an inclosure, the natural conditions of ventilation. These windows occupy by far the greater part of the wall space of the building, which is made possible by the use of steel sash to support these large expanses of glass. Most of the windows are 17 feet, 2 inches wide, but where the brick pilasters divide them, they are 15 feet wide. The windows consist of three tiers of 24 panes of glass each. Each tier of glass is divided into three sections, eight panes to the section. Two of the sections of the lower tier and one section of the upper tier are swinging sashes, affording a large space for the free current of air. The windows in the monitor walls above the second floor have three sections in each sash, one of which can be opened for ventilating purposes.

Lighting and Ventilating Facilities

The high ceilings of both floors greatly facilitate ventilation. The first floor is 17 feet high and the monitor extends to a height of 24 feet above the second floor. The walls and supporting concrete columns of both floors are painted white. The lighting of the building is carried out on such an elaborate scale that it is found necessary to modify the flood of light which enters when the sun is shining brightly. Shading the windows because of their extensive area presented a problem of considerable difficulty. To have used roller shades would have involved a heavy expense. By the use of unbleached cotton portieres the proper screening was accomplished in a very satisfactory and efficient manner. Sections of galvanized steel pipe are attached to the sides of the window casements at the top by means of wooden brackets. Curtain rings were placed over this pipe to which the portieres were attached. At the bottoms of the windows the cloth was fastened to the smaller rings on a wire. The curtains at the top are opened or drawn by cords running over pulleys which are operated from the floor. At the bottom, the rings are moved by hand.

The first manufacturing operation consists of passing the screw stock through the heading machines which are arranged in a group on the first floor. This equipment is made up of the necessary complement of double stroke, solid-die headers and open-die headers required for the large tonnage passing through this department. The machines are belt-connected to a main shaft which is driven by a 50-horsepower General Electric motor. These machines automatically head and cut to screw

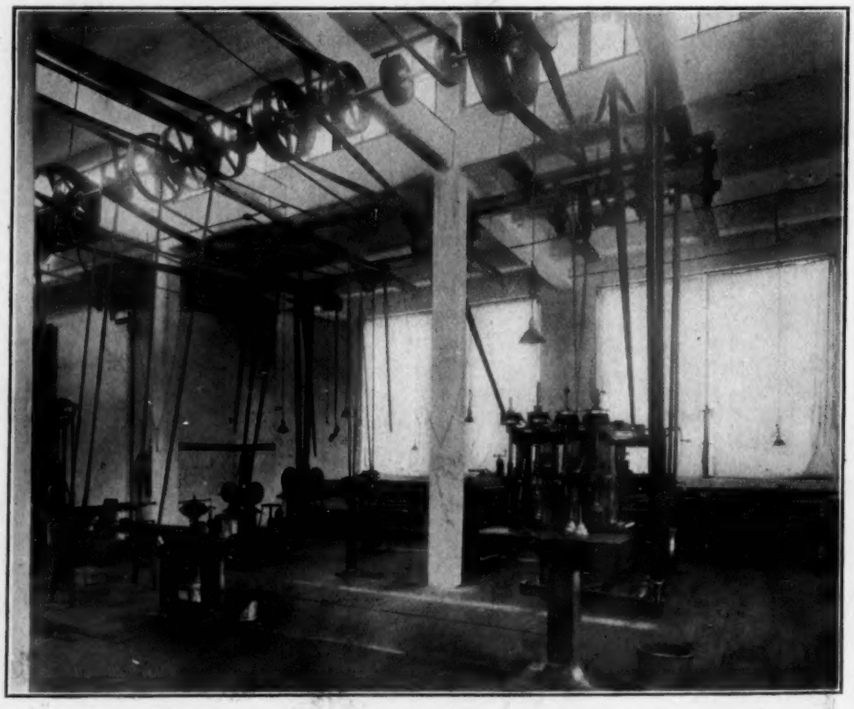


FIG. 3—A VIEW OF THE PLANT MACHINE SHOP

length the wire stock which is fed from large reels. Wire of all gages to No. 30 is used, thereby insuring a wide range of screw sizes. For round-headed screws open-hearth wire is used and Bessemer wire is used for square heads. After heading, the blanks are delivered to the cleaning department in tote boxes containing approximately 70 pounds each. These boxes are piled on small three-wheel floor trucks and are delivered to the cleaning room located in one corner of the first floor. The headed stock is dumped into tumbling barrels partially filled with sawdust which serves to absorb a considerable amount of the oil on the stock. The oil-saturated saw-dust, when discharged from the barrels, is burned and the particles of scrap steel contained therein are recovered. The equipment of the cleaning room consists of several tumbling mills which are belt-driven by a countershaft operated by the same motor that furnishes the power for the heading machines.

FIG. 5—STEEL RACKS FOR THE STORAGE OF FINISHED SCREWS

Slotting and Threading Department

After being cleaned and polished, the headed blanks are conveyed to the second floor, two elevators being employed for this purpose. The slotting and threading machines on this floor are divided into two groups, each being arranged in several parallel lines. The first group consists of 23 slotting and shaving machines. Parallel to the slotting machines is the second group of threading machines. The headed blanks first are fed to the slotting and shaving machines, which cut out the slots in the heads and taper the material to screw size. The stock next is cleaned in steam baths after which it is carefully examined for imperfections and then is fed to the threading machines which complete the cycle of manufacturing operation. Before each machining operation, the material is carefully weighed and the loss of metal is calculated. The scrap, consisting of turnings, etc., is collected in boxes and is accumulated in the yard where it is disposed of, at intervals, in carload lots. The installation of a chute from the second floor to the yard, which will eliminate the handling of these turnings, is contemplated.

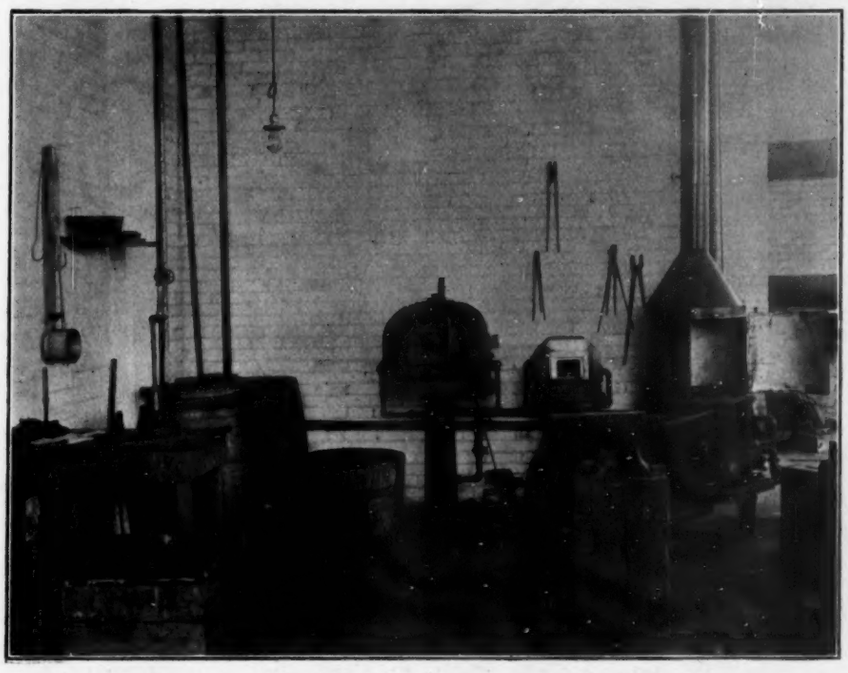


FIG. 4—DIE-TEMPERING AND HAR DENING DEPARTMENT

The slotting and threading machines are belt-driven from shafts operated by the three 50-horsepower motors located on a concrete slab spanning several transverse beams which extend across the lower part of the monitor and form a loft. In the center of the second floor, between the two groups of slotting and threading machines, are located five grinders for sharpening tools. This equipment is auxiliary to that of the machine shop located in the ell. From the threading machines the finished screws are delivered to the inspection and packing benches arranged along the sides and end of the second floor. Here the finished product is boxed for shipment.

Storage and Shipping Departments

The stock wire storage and shipping departments, in addition to the heading and cleaning departments, are located on the first floor. The finished stock is stored in parallel rows of steel racks extending from the floor to the ceiling and which contain six tiers of shelves. These racks have a capacity for storing 2,000,000 gross of screws.

The power plant, die-heading and tempering department are located on the first floor of the ell. The electric current is purchased from a local power company and is stepped down from 12,000 to 220 volts by a transformer in the power house. Boilers, including heating and high pressure units, complete the equipment of the

FIG. 6—OPERATING THE CURTAINS

power plant. The die-heading and tempering department is equipped with three furnaces, two gas and one oil. On the second floor of the ell is the plant machine shop in which dies, tools, etc., necessary to the operation of the works are manufactured. Metal-working machines are belt-driven from a motor-operated shaft.

W. H. Farrell, president of the Bridgeport Screw Co., is a brother of James A. Farrell, president of the United States Steel Corporation. His first employment when a boy was in the plant of the New Haven Wire Co., and later he worked in the wire mill of the Oliver Roberts Co., Pittsburgh, and the Salem Wire Nail Co., Salem, O., having been employed by the latter as a journeyman wire drawer. Later he was appointed superintendent of the Kilmer Mfg. Co., Newburgh, N. Y., and subsequently was made general foreman of the Pittsburgh Wire Co., Braddock, Pa. In 1898 he was promoted to the position of general superintendent of the plant and at the same time he also served as superintendent of the Continental Wire Co., Granite City, Ill. When that company was absorbed by the American Steel & Wire Co., Mr. Farrell was retained as superintendent. In 1889 he was employed by the Union Steel Co. to supervise the erection of its plant at Donora, Pa., which later was absorbed by the United States Steel Corporation. While thus engaged, Mr. Farrell was appointed manager for the receivers of the Page Woven Wire Fence Co., Monessen, Pa., and operated this plant in addition to that of the Union Steel Co. Extensive economies were effected and the administration and earning power of the company was so increased that a reorganization of the Page Woven Wire Fence Co. was easily effected. In 1906 Mr. Farrell was elected president of the Dominion Wire Mfg. Co., Montreal. Wood screws formed an important part of the product of this company and his experience in this line led Mr. Farrell finally to establish the Bridgeport plant. During his three and one-half years of employment at Montreal, the plant was remodeled and extended and the annual output was increased from 12,000 to 40,000 tons. In 1910 the company was absorbed by the Steel Co. of Canada. Mr. Farrell continued as manager until March, 1911, when he resigned to undertake the construction of the Bridgeport Screw Co.'s plant at Bridgeport, Conn.

FIG. 7—GENERAL VIEW OF THE FIRST FLOOR, SHOWING THE TYPE OF INTERIOR CONSTRUCTION; THE STORAGE DEPARTMENT IS IN THE FOREGROUND

Belgian Pig Iron Production

During the first quarter of 1912, the pig iron production of Belgium exceeded the output of the corresponding period of 1911, by 50,150 tons, having reached a total of 555,650 tons, as against 505,500 tons last year. The output consisted of 8,950 tons of forge iron, 23,600 tons of foundry iron and 523,100 tons of Bessemer and basic. Compared with the previous year, this represented gains in foundry, Bessemer and basic pig, and a decline in forge iron. The increase in Bessemer and basic amounted to 51,740 tons; in foundry 11,850 tons, and the decrease in the forge iron output amounted to 13,440 tons. The total number of blast furnaces in operation in Belgium at the close of March, 1912, was 45 and five were out of blast. In the corresponding period of last year there were 41 furnaces in blast and six out of blast.

Features of the American Rail Situation[1]

Rail Steel Manufacturing Problems and How These Are Being Overcome by a Better Understanding Between Producers and Consumers

By J P Snow

The objective sought by purchasers of rails during the past score of years is steel that will resist wear and flow of metal and at the same time will possess safety against fracture and sufficient strength of section to carry the load without undue deflection.

The wheel load imposed upon rails is now so near the limit of endurance of carbon steel that it is necessary to seek for the highest attainable character of metal that can be secured on a commercial basis.

At the time of the general adoption of Bessemer steel rails, after wrought iron had proved inadequate, it was everybody's privilege to prescribe a section of his own, with the result that the principal burden of rail mills was to provide and find storage for the accumulation of rolls grooved to turn out the numberless patterns demanded.

Early Rail Specifications

In 1893 a committee of the American Society of Civil Engineers reported a series of standard sections for various weights of rail, which has been used very largely by many roads since. This series is of the thick-base, heavy-head, medium-height, tee rail type; the width of base is equal to the height of rail. Its adoption brought a large measure of relief to the mills in the matter of changing rolls.

In the decade following 1895, improvements in plants and changes in methods of making rails were made at various mills, which resulted in greatly increasing their output, but which also apparently resulted in decreasing the durability and reliability of the rails. Many roads in the northern section of the country were troubled with split bases resulting in base breaks of the crescent type, and roads using very heavy equipment recorded many failures due to split heads. Square breaks were numerous also, as well as trouble from flow of metal and lamination of corners.

Split bases were traced pretty generally to longitudinal flaws in the surface of the base due to folds in the skin of the bar during the process of rolling, gas holes in the ingot, or breaks in the surface of the bloom caused by heavy reductions in the early passes.

Split heads were proved to be due to lack of homogeneity of metal in the heads. This same defect led also to square breaks, as well as to lamination and shelly corners.

The metallurgical studies which developed these facts were inaugurated by James E. Howard of Watertown arsenal, who cut, polished and etched a very large number of rails, both those which had shown good service and those which had failed. Ingots, blooms, rail bars and finished rails were also cut-up and studied, showing the complete history of the steel from the ingot to the rail. Altogether this was the most exhaustive study of the actual physical condition of steel during the rolling process that has ever been recorded. These and subsequent studies by Max H. Wickhorst show that unsoundness in rails, as manifested by light and dark streaks and inclusions of slag and various compounds of metalloids, has its origin in the ingot and ladle.

The agitation produced by these studies, and by the unsatisfactory records of rails in service, led to the efforts on the part of the rail manufacturers, consumers, experts and others to improve matters, with the result that American rails as rolled today are much better than those rolled five or even three years ago. Improved methods of recarburizing and deoxidizing the Bessemer bath, with reasonable allowance of time for the chemical reactions to complete themselves; more care to prevent phosphorus from being reabsorbed from the basic slag in the open-hearth; closer attention to features tending to reduce shrinkage pipes, gas holes and segregation in ingots; more care in rolling during the heavy reductions in the early passes in the blooming mills; care in keeping the right temperature to the end of the rolling; and proper appliances and skill for handling the rails on the cooling skids and in the process of cold straightening, have all helped to improve quality.

On the part of the consumer it was thought by some that if the base was made thicker the section would be more symmetrical and the rail as a whole could be rolled cooler, because the heavier base would retain its heat more nearly equal with the head. It was thought also that the thicker base would not split and produce crescent breaks so readily as the thin bases. This reasoning seemed so sound that about 1907 two types of thick-base rails were designed by a committee of the American Railway Association, and they have been in service quite extensively for three years.

Further improvements in manufacture are constantly being made. Some things are tried which look good to their originators but which turn out badly and are dropped. But, unfortunately, while they are being tried, rails are necessarily made, with the result that unsatisfactory rails get into the track.

Chromium and Nickel Unsatisfactory

Rail steel does not strictly follow the rules which have been found satisfactory in the case of structural steel. Chromium and nickel have been tried as alloys in rails and have proved very unsatisfactory. The nearer absolute homogeneity can be approached the better the rail appears to be.

Segregation seems at present to be our greatest enemy. This natural phenomenon cannot be wholly prevented in melt-made steel. Its effect is to produce higher carbon, phosphorus, etc., in a part of the interior metal of the ingot than at the outside. In rolling, this interior portion becomes the central mass of the head and web. The filaments made up of the harder interior metal resist the stretching action of the rolls to greater degree than the softer surrounding metal, and, in consequence, are in a condition of great initial tension in the completed rail. Some of our failures are due to these highly strained threads of metal giving way under the stress of service, leading eventually to a broken rail. The initial fracture, being interior, cannot be discerned until it reaches the outside of the metal.

Rails that have given good service are found to contain segregated material, dark carbon streaks and other evidence of non-homogeneity. This

[1]Presented at the International Congress for Testing Materials.

fact leads to the belief that these imperfections are not fatal if present to a reasonable degree only.

As to the thick-base rails adopted by some roads after the studies of 1907, the only advantage that can be claimed for them is that they cool with less curve than the thin-base types. This is an advantage, because the less cold-straightening, the better; but whether this one advantage is worth the cost of the metal added to the base is a question not yet settled.

Is the 80-Pound Rail Superior?

Speaking generally in regard to form of section, it can be said that the slight advantage of one section over another is entirely lost sight of in the greater consideration of soundness of metal. It is a fact that the wearing qualities of the heavier rails of all types have not been satisfactory, in many instances. It is even claimed by many persons that the older rails of 80 pounds per yard are giving better service than those of 100 pounds of recent make. This fault of the heavier rails is variously ascribed to less work of reduction and to a higher finishing temperature.

A large portion of the rail rolled in this country now is of open-hearth steel. This is due to the fact that ores low enough in phosphorus to use in the acid-lined Bessemer converter are growing scarcer, and also to the impression among consumers that the open-hearth process should produce the better metal. There is no doubt but that pig iron made from Lake Superior ore is better adapted for reduction on a basic than on an acid hearth; and, as basic Bessemer is out of the question in this country, open-hearth by the basic process is the logical solution of the problem. Manufacturers demand $2 per ton more for open-hearth than for Bessemer rails and buyers are paying this in the hope of securing more durable and more satisfactory rail.

Preference for Open-Hearth

The usual specification for phosphorus in open-hearth rails is, not to exceed 0.04, and in Bessemer 0.10 per cent; carbon, for the former 0.63 to 0.76 per cent, and in the latter 0.45 to 0.55 per cent. It is quite sure that carbon is a safer and better hardener than phosphorus; and, on account of the difference in applying the blast during reduction, it is claimed that the bath is less loaded with oxygen in the open-hearth than in the converter. These considerations, coupled with the established preference for open-hearth steel and the abandonment of Bessemer in bridge building, have influenced buyers in favor of the former, even in the face of its higher price.

Open-hearth rails are somewhat new both to the majority of our mills and to most of our railroads. The results from their use have not, so far, been fully satisfactory. The causes of this are now becoming better understood, with the result that when conditions are favorable these rails show their superiority over Bessemer. Nothing is more certain than that simply changing from the Bessemer to the open-hearth process will not insure a radical improvement in rails; nor is there any panacea that can be applied by a turn of the hand that will bring about the improvement that a part of our public seems to think possible.

The so-called duplex process, in use at mills fitted with both Bessemer converters and open-hearth furnaces, appears to be an economical and proper method of producing steel for rails. It consists in burning out the carbon and silicon in the acid converter and then charging the bath into the basic open-hearth furnace where the phosphorus is reduced and the process is completed.

Titanium Used With Good Results

Titanium has been used to a considerable extent as a deoxidizer with apparently favorable results. It acts like vanadium, as a cleanser, and is not found in the completed product. Its cost adds from $1.50 to $2 per ton to the cost of the rails.

Scientific committees working under the auspices of the American Railway Association, through the American Railway Engineering Association and the American Society for Testing Materials, are actively studying the rail-making question in close connection with the manufacturers. It is thought that valuable progress has been made, that improvements have been adopted at many mills which have manifestly improved the rails in quality, and that if the whole output could be insured to be as good as the best, all reasonable demands would be fulfilled.

It is certain that there is a better understanding between the manufacturers and consumers now than has at times existed in the past. Genuine efforts are being made to correct methods that are thought to lead to unsatisfactory results, and there is a spirit of willingness among all parties concerned to experiment on a liberal scale with a view to determining scientifically the effect on the finished rail of features of practice which have heretofore been discussed wholly from an academical standpoint. Accidents occur, and sometimes, though not often, can be ascribed to a defective rail. When this condition occurs the public may rest assured that all that can be learned from the trouble is learned by experts constantly concerned with the improvement of rails, and that the knowledge so obtained will be used to prevent the recurrence of similar cases.

Rail Steel Manufacturing Problems

The manufacture of steel of a sufficiently high grade for use in rails is a far more delicate operation than the making of milder steel such as is used for bridges. The recarburizing process, the passage of the molten steel from the ladle to the molds, the condition of the molds and of their stools, and the handling of the ingot to the soaking pit, are delicate features. The setting of the steel, that is, its change from the fluid to the solid state, is a wonderfully delicate natural phenomenon. Steel is a compound intermediate in composition between wrought iron and cast iron. It is more unstable than either, and in the process of solidifying it gives up part of the contained metalloids to adjacent metal more fluid than it. Gases, especially oxygen (and probably hydrogen), are entrained in it while fluid, chemical salts due to recombinations during the deoxidizing and recarburizing process are formed, and the wonder is that the metal is as solid and homogeneous as it is.

The difference of the temperatures at which the various contained ingredients solidify is a disturbing factor, and the intricate interdependence of all these features, the chemical change going on and the precise temperature at which the changes occur, render the problem too complex for scientific analysis beforehand. Long practical experience alone can fix upon the exact procedure necessary to produce the best results. As certain practices are proved to be good they are adopted, while those which apparently lead to occasional bad results are abandoned. However, it takes two or three years to develop these qualities, good and bad, and trace them back to their sources.

The floating ship dry dock, "Duke of Connaught", built by Vickers, Ltd., at their naval construction works at Barrows-in-Furness, Eng., for their new works at Montreal, recently sailed on her voyage across the Atlantic. This dock is one of the largest yet built and is capable of lifting the largest existing vessel in the British navy. The length over platforms is 600 feet and the width overall, 135 feet. The lifting capacity is 25,000 tons and the construction such as to make it suitable for lifting a modern British battleship.

How to Insure Soundness in Steel Rails[1]

Until Sound Ingots Are Commercially Made the Arbitrary Rejection of the Upper Part of Ingots for Rails is Recommended

By Robert W Hunt

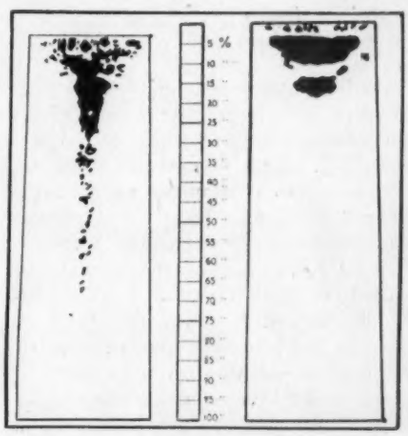
While steel rails have been of great scientific and engineering interest from the day of their first experimental use, and much literature has been written upon them, there has never been a time, at least in America, when matters relating to their manufacture and service have received as much public and even governmental attention as during the past two years.

I have been actively identified with the manufacture of steel rails from the rolling of the first commercial order for them in America up to and including the present time. As a steel maker I became thoroughly familiar with the theoretical and practical details of the business; and later, as a consulting engineer and inspector of all steel products, and especially of steel rails, I have endeavored to keep in touch with and cognizant of everything relating to the art.

Sound Ingots the Problem

All steel rails are made from steel ingots; steel ingots are formed by pouring or casting liquid steel into cast iron ingot molds. The larger the cross-section and the greater the length of the ingots, the greater the difficulty in obtaining sound castings, that is, sound and homogeneous ingots. Without sound and homogeneous ingots it is impossible to produce sound and homogeneous rails; and, unfortunately, the most important unsoundness will be first in the center of the ingot, and last in the center of the rails produced from it, where it is frequently impossible to detect without destroying the rails. The large tonnage in each heat of rail steel, whether made in Bessemer converters or in open-hearth furnaces, under present mill practice, necessitates the casting of ingots of large cross-section and long enough to make several rails.

It is a well-known fact that the greater the mass of steel in a casting, the greater the tendency of the metalloids—carbon, phosphorus, sulphur, and silicon, and particularly the hardening metalloids phosphorus and carbon—to segregate at the part of the casting where the metal remains longest liquid, which, under normal conditions, is at the center and toward the top of the mass. Again, it has long been known that the necessary cooling of the metal from the outside inwards causes a contraction which results in the formation of a cavity or pipe, which defect is increased by hasty and uncontrolled casting of the molten steel into ingot molds. Over 20 years ago Robert Forsyth, then chief engineer



FIGS. 1 AND 2—CROSS-SECTION OF STEEL INGOTS, SHOWING SEGREGATION.

and manager of the Union Steel Co., Chicago, demonstrated that if rail ingots were laid on their sides before the interior steel had set, the pipe would not be formed in the middle of the top end of the ingot, but upon the upper side and would be liable to extend toward the bottom end; and that, therefore, ingots should be left standing in a vertical position until the interior metal had solidified.

Much time, labor, and money have been expended in seeking to overcome the piping and segregation in ingots without greatly increasing the cost of production through expense of operation, lessening product, etc. Technically, several of the schemes have given good results, but they require increased cost of manipulation, and most serious of all, more time. Unfortunately for success in casting sound ingots, modern practice has been in the direction of larger heats of steel, and it is easy to appreciate that with a casting ladle containing up to 100 tons of liquid steel, much if any control of the stream flowing through its nozzle is an impossibility; therefore, the soundness of the resulting ingots is a matter entirely independent of the personal skill of the workmen. However, because the efforts to produce sound ingots have not been generally commercially successful, I am loath to believe that the difficulties will never be overcome. Such has not been the spirit under which the great successes of the past were accomplished, and I do not think it now exists. If a positive necessity for sound ingots be commercially established, a commercial way to produce them will be found.

As the general existing conditions produce ingots with the most undesirable steel in their upper part, it has been and is the practice in manufacturing steel locomotive tires, ordnance forgings, armor plate, large steel shaftings and other what are termed high grade products, to arbitrarily reject at least the upper one-third of the ingot. It is true that even so great a discard will not always prove an absolute safeguard, but if the ingots are carefully made it will do so. Against bad or ignorant workmanship, it is hard to find any absolute protection.

Steel Discard

In rail purchases it has been found impractical to secure so great a discard. Personally, I believe the future will bring it, unless the insistence upon it shall lead to improved methods in casting ingots; until that time comes, I think that, through the railmakers developing other uses for the discarded steel, the decided increase of cost will be avoided.

Experience has proven that rails made by the basic open-hearth process are more liable to have interior pipes and segregated spots than Bessemer rails; no doubt principally because the ingots are larger and the size of the heats prevents slow casting. Of course the smaller contained percentage of phosphorus lessens the

[1]Presented at the International Congress for Testing Materials.

FIG. 3—FRACTURE OF RAIL, SHOWING EVIDENCE OF SEGREGATION ALONG CENTER OF WEB

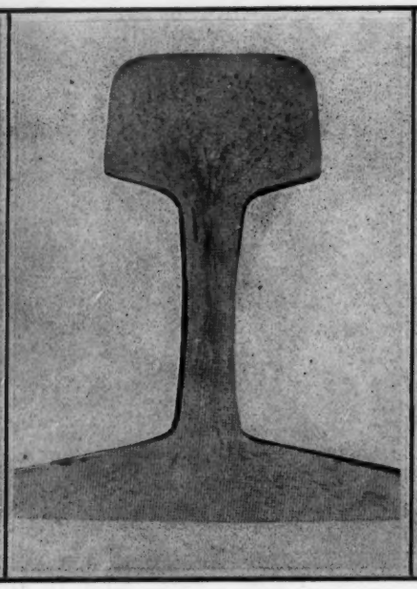


FIG. 4—FRACTURE OF FIG. 3 AFTER ETCHING.

FIG. 5—FRACTURE OF RAIL, SHOWING EVIDENCE OF SEGREGATION ALONG CENTER OF WEB

Analysis of rail, Fig. 3:—Corner of head, 0.674 per cent carbon and 0.023 per cent phosphorus; center of web, 0.895 per cent carbon and 0.047 per cent phosphorus.
Analysis of rail, Fig. 5:—Corner of head, 0.72 per cent carbon and 0.035 per cent phosphorus; center of web, 1.03 per cent carbon and 0.067 per cent phosphorus

danger from its segregation, but the greater carbon content made possible by the low phosphorus, increases the segregation of that element.

Intelligent and careful investigation by a committee of the American Society of Civil Engineers, of which I had the honor of being secretary, resulted Aug. 2, 1893, in the recommendation of a series of rail sections which, while not adopted by all American railways, were used by so great a number that they became accepted as standard sections. In 1902 another committee was appointed by the same society, of which also I was secretary. That committee, while deciding not to recommend any changes in rail sections, did present certain specifications governing the manufacture of rails. Later developments resulted in that committee asking to be discharged in favor of one more directly representing the railway organizations of the country; and this committee (American Railway Association committee) recommended, under date of March 23, 1908, a series of rail sections which have, to a certain extent, displaced the so-called American Society sections; and, in my judgment, wisely so. The same committee has recommended rail specifications; several railway companies have adopted their own, and the rail manufacturers have what are known as standard specifications, all seeking to secure good-wearing and safe rails. All of this has been accompanied by much discussion, and I know has resulted in much good, but

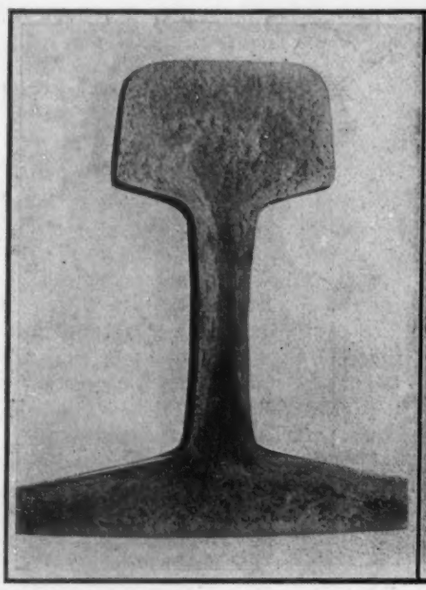


FIG. 6—VIEW OF FIG. 5 AFTER ETCHING

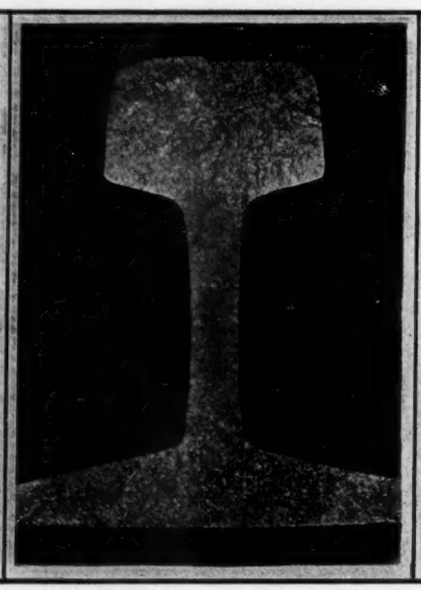


FIG. 7—FRACTURE OF RAIL, SHOWING EVIDENCE OF SEGREGATION ALONG CENTER OF WEB

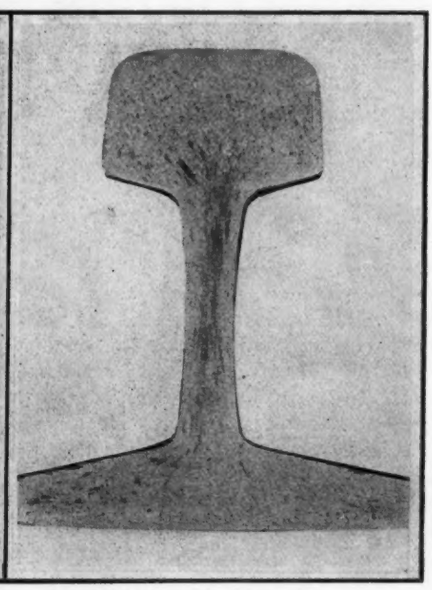


FIG. 8—VIEW OF FIG. 7 AFTER ETCHING

Analysis of rail, Fig. 7:—Corner of head, 0.656 per cent carbon and 0.024 per cent phosphorus; center of web, 0.888 per cent carbon and 0.045 per cent phosphorus

we are still away from the desired certainty of safety.

I believe we can afford to let the chemical requirements remain as they are in most of the specifications. Their physical requirements as to finishing temperature also are sufficient, and most of them provide for sufficient drop-testing so far as determining the quality of the steel of the several heats as metal; but they do not go far enough to give protection against unsound ingots. Practically all specifications require that the test piece shall be taken from the upper end of the rail made from the top of the ingot; and several require that after drop-testing, if the piece has not broken, it shall be nicked and broken to expose the interior, and if the interior of the rail shows any defects all of the *A* or top rails of the heat shall be rejected. But each ingot is an individual or separate casting; and because one is sound, it does not prove that the others, say four in Bessemer, or 29 in open-hearth practice, are also good castings. As showing what does happen, I illustrate, in Figs. 1 and 2, diagrams of two ingots which were cut longitudinally through their centers.

Rail Testing

With such variation as here shown, it follows that the test piece from one ingot would not be representative of the other one. Therefore, I favor drop testing as now, and nicking and breaking those test pieces, and also a piece from the rails made from the upper end of each and every one of the other ingots, and accept the seemingly sound and reject the proven unsound *A* rails. And I would go further and provide that, where unsoundness is shown, another test piece shall be cut from the lower end of the represented *A* rail and nicked and broken; if it also shows unsoundness, then the *B* rail of that ingot shall also be rejected, and another piece cut from the lower end of that *B* rail, and, if unsound, the *C* rails condemned; and so on for the remainder, if any, of the ingot. This makes a practical way of determining how far the pipe or segregation has extended down the ingot, with the minimum destruction of merchantable rail. Such a plan of testing is not entirely new in principle, and was in part suggested by the late William Metcalf in 1908, when he was consulted by the rail committee of the American Railway Association. The additional test pieces can be taken from the rail ends which are made in hot-sawing the rails, and can be broken under much less cumbersome tools than the drop-testing machine, and at small cost.

As to what constitutes interior defects, I unhesitatingly specify not only laps or pipes, but also silvery or bright spots, or other indications of non-uniformity. Etchings and analyses of a great many examples of the latter have proven them to unfailingly indicate segregation. Sections of nicked and broken rails and of the same pieces after having been polished and etched, are shown in Figs. 3 to 8. Analyses of drillings taken from the indicated positions also are included. The results of other analyses of such spots are given in the accompanying table. These tell their own story.

Rails with segregated centers do not always fail under the drop test, nor does the elongation test which is required by some specifications indicate their existence, but, unfortunately, it has been demonstrated that rails with such hard centers fail through the softer surrounding metal breaking down and thus producing split heads, and often broken rails.

I am fully convinced that, until sound ingots are commercially made, the safest procedure is to arbitrarily reject the upper part of every ingot for rail rolling. It has been demonstrated that high-carbon steel gives more satisfactory service in splice bars than softer steel; in fact it has been for several years the regular practice of some of the largest railway systems to use such steel, their chemical specifications being practically the same for both rails and bars. Undoubtedly this harder steel would also yield good results in tie-plates and where the danger of interior unsoundness renders this steel undesirable for rails, said unsoundness, when existing, would not of necessity make it unsuitable for either splice bars or tie-plates. These two articles would furnish a place for the use of a large part of the steel contained in the greater discard in the rail practice. Obviously, its use would revolutionize the splice plate and tie-plate making, but there have been many metallurgical revolutions and all of them have tended toward the betterment of the iron and steel industry.

It may be that present and future railroad practice will require rails of heavier and otherwise different sections from the present ones, but we can never escape from the necessity of having them physically sound.

Analyses of Segregated Rails.

Rail No.	Result of drop test.	Kind of steel.	Appearance of fracture on nick break.	Appearance of etching.	Chemical analyses—Mill ladle. Carbon. per cent.	Mill ladle. Phosphorus. per cent.	Drillings from center of web. Carbon. per cent.	Drillings from center of web. Phosphorus. per cent.
1	O. K.	Bessemer	Segregated	Unsound	0.45	0.10—	0.691	0.165
2	O. K.	Bessemer	Segregated	Unsound	0.45	0.10—	0.634	0.152
3	O. K.	Bessemer	Segregated	Unsound	0.46	0.10—	0.666	0.138
4	O. K.	Bessemer	Segregated	Unsound	0.48	0.10—	0.761	0.173
5[1]	O. K.	Bessemer	Segregated	Unsound	0.45	0.10—	0.797	0.173
6	O. K.	Bessemer	Segregated	Unsound	0.47	0.10—	0.722	0.142
7	O. K.	Bessemer	Segregated	Unsound	0.53	0.10—	0.656	0.145
8	O. K.	OH	Segregated	Unsound	0.71	0.029	0.829	0.043
9	O. K.	OH	Segregated	Unsound	0.67	0.040	0.727	0.059
10	O. K.	OH	Segregated	Unsound	0.62	0.022	0.919	0.042
11	O. K.	OH	Segregated	Unsound	0.71	0.039	0.990	0.060
12[2]	O. K.	OH	Segregated	Unsound	0.64	0.028	1.009	0.057

[1]5—Analysis drillings from corner of head gave carbon 0.439, phosphorus, 0.063.
[2]12—Analysis drillings from corner of head gave carbon 0.646, phosphorus, 0.023.

Paint Production in 1911

The production of mineral paint in the United States is an important industry. In 1911, according to the United States geological survey, the value of the paint produced from all sources was $31,822,827. Paints are divided by the survey into three groups —natural mineral pigments, pigments made directly from ores, and chemically manufactured pigments. Of the total production of paint in 1911, $498,821 are to be credited to natural mineral pigments, $7,343,762 to pigments made directly from ores, and $23,780,244 to chemically manufactured pigments. The production of natural pigments was less than in 1910; that of pigments made from ores increased; that of chemically manufactured pigments decreased. There was a total decrease in value, compared with the value for 1910, of $241,495.

The W. T. Pyne Mill & Supply Co., Louisville, has installed a department for sheet metal work, particularly in the structural division, and is now turning out stacks, tanks, etc. Most of the equipment for the department was installed by J. T. Ryerson & Son, of Chicago.

Typical Cast Iron Uses and Applicable Tests[1]

How Cast Iron Sections Are Variously Employed in the United States, With Suggestions for Additional Quality Tests

By John Jermain Porter

American foundry practice has made great progress in passing from the empirical stage to that of scientific control. A most important feature, the use of chemical analysis as a basis for mixing irons, is now practically universally adopted, but much still remains to be done both in the more efficient use of chemistry and in the adoption of other scientific methods of control.

It is now becoming quite widely recognized that chemical composition is not the only factor determining the properties of cast iron, but, although the importance of structure is known, the methods of metallography have received very little attention from foundries and users of castings. It is true that investigators have used the microscope on cast iron with valuable results, but this method of control has not yet been generally taken up in practice as in the case of steel. The two reasons which apparently account for this neglect are first, the fact that foundries, being operated in smaller units, have as a rule less technical skill available at each individual plant; and, second, that the more complex structure of cast iron makes the interpretation of its microstructure much more difficult.

Presence of Oxygen and Nitrogen

The theory that oxygen and nitrogen may be present in cast iron and are accountable for some otherwise inexplainable phenomena is gaining ground among practical foundrymen, and means of eliminating these elements are being widely adopted. Greater care is being given the cupola process, and the use of ferro-manganese, silicon, vanadium and titanium as deoxidizers is rapidly increasing. Ferro-alloys are also rather extensively used to correct the composition of the iron in the ladle.

Since cast iron is used for a wide variety of purposes, it is obvious that the properties by which its value is measured and the tests to which it is subjected should be different for each class of castings. Hence it is necessary to consider each class separately. It is true that current practice does not as a rule adequately recognize this fact, and almost the only test which is commonly applied is that for transverse or tensile strength, although this property in many or perhaps the majority of cases is not of chief importance.

The succeeding portion of this paper will discuss some characteristic American uses of cast iron, the properties needed, recent progress in meeting these needs, and the tests necessary to define the desired properties.

Machinery Castings

A large percentage of machine parts are made of cast iron, which material is especially adapted for this use on account of the ease with which it is cast and machined into the desired shape. The more important properties desired in machinery castings are softness, strength, and a fine grain-structure, in addition, of course, to freedom from visible defects such as blow-holes, cracks, shrinkage cavities, etc.

It is an easy matter to make soft castings, but to get the combination of easy machining properties, strength, and close grain, as demanded by some users, has proved a difficult proposition to many foundries. Especially is this true as to closeness of grain and the ability to take a high polish, which is so desirable on many finished parts. The solution has been reached in various ways. The use of charcoal iron is one method, satisfactory except from the standpoint of cost. Certain brands of coke irons are found to give greater strength and closer grain for a given softness than others, and the knowledge of such mixtures is a valuable asset to the practical founder. Another method is found in the use of steel scrap in the cupola mixture, making the so-called semi-steel, which gives a closer grain-structure and considerably more strength without material change in composition. The treatment of the metal with certain ferro-alloys has also been found advantageous in this connection.

Hardness, Strength and Grain Size

The buying of machinery castings would be greatly simplified if definite limits of hardness, strength, and grain size, could be specified. Satisfactory methods for testing hardness are found in the drill test and the Shore scleroscope, most of the various other proposed methods being too cumbersome for commercial use. The drill test, simulating as it does actual machining operations, gives the more reliable results, while the scleroscope possesses the advantage that it can be used directly on the casting without in any way injuring it.

For testing the strength of cast iron there are available the ordinary transverse, tensile and compressive tests, the first of which is, in the opinion of the writer, preferable. In the testing of strength (and hardness also) it must be remembered that the properties of cast iron depend in part upon the thickness of the section, and hence that, in cases where it is not possible to test the casting itself, the test piece should at least approximate the section of the casting. Probably three standard sizes of test bars could be selected, to represent the three classes of light, medium and heavy castings. The broken ends of these bars could be then used for the drill test to determine hardness.

Test for Grain Size

For grain size there is no practical test available; a serious lack, as in many cases this property is of the greatest importance. Possibly something might be done with a planimeter used on a microphotograph of standard magnification; a rough test, of value in some cases, can be made by comparing the fracture of a broken test bar with a scale made of previously broken test bars of varying grain size.

The freedom from blow-holes and other casting defects is best determined by ocular inspection. Unfortunately there is no method of inspecting the interior of the casting without destroying it, and while the tendency of the iron to shrinkage, blow-holes, etc., can easily be tested, such tests would be of doubtful utility since these troubles are frequently, if not usually, due to faulty molding and pouring.

Cast iron is still very generally used for hydraulic work, on account of the ease with which it is formed into shape, although there has been some attempt to substitute steel for very high pressure. The properties desired in the metal are practically the same as in the preceding case, except that they

[1]Presented at the International Congress for Testing Materials.

stand in a different order of importance, close grain and freedom from shrink-holes and spongy places being the first consideration. Much the same means are used to obtain the combination of density, strength and the ability to machine easily, but as the importance of density is greater in this case, the use of special means, such as charcoal irons, steel scrap and ferro-alloys, is more frequent.

The most direct and satisfactory test for hydraulic work is to subject the casting itself to some specified hydraulic pressure. In many cases, however, the casting cannot be so tested until a good deal of expensive machine work has been done on it, and in this event it seems advisable to specify the strength and hardness tests previously described. The hardness test should be used in any case, as the bursting strength does not, of course, give any idea as to machining properties. A test for grain structure would be especially valuable in connection with this class of work.

Electrical Machinery

For parts where high electrical permeability is of prime importance, cast iron has been largely displaced by steel, but in the majority of cases it still holds its own on account of the greater ease of forming. The permeability of cast iron, although always low as compared with that of the purer forms of iron, can be considerably improved by keeping the manganese very low and the silicon quite high. In practice, however, not much attention is usually given to this property, since the greater number of castings are used in parts of machines not carrying the magnetic lines of force, and hence having requirements not different from ordinary machinery castings.

In electrical castings a permeability test used in conjunction with strength and hardness tests should be sufficient to define the quality of the material. Since permeability probably bears a fairly close relation to chemical composition it might be possible, although certainly less satisfactory, to specify analysis in place of permeability direct.

A large variety of castings must be classified as heat and chemical-restraint; the best known examples are probably ingot molds and grate bars. Only a few foundries are giving attention to producing castings of these special properties, and there is but little generally available information. Grate bars, for example, are ordinarily made of the cheapest possible mixture irrespective of its quality as regards service. In the case of ingot molds, on the other hand, some pains are taken to obtain the special quality of heat-resistance, and a low-phosphorus iron is always used for this purpose.

There are no tests for heat-resistance and chemical-resistance of cast iron in common use. For heat-resistance it is a very difficult matter to devise any single test which will answer for all classes of castings, since the effects of heat are manifested in several different ways. Chemical analysis may be specified with advantage in some cases, since the melting point of cast iron depends chiefly on this factor. Resistance to the action of chemicals can be tested directly without much difficulty in a manner similar to the accelerated corrosion test used on steel. There is, however, great need for the standardization of all conditions under which such tests are made, so that comparable results may be obtained.

Chilled car wheels form one of the most interesting applications of cast iron in American practice. The service conditions for these wheels are very severe. The load on each wheel often amounts to between 10,000 and 20,000 pounds. They are constantly subjected to heavy blows due to pounding at rail joints. The friction of the brake-shoes induces severe heat strains in the tread. Finally, the users of these wheels demand that they have a high resistance to wear. Owing to the nature of their service any failure is apt to be attended with very serious results, and hence great pains must be taken to insure a uniformly high quality of product.

The results desired are produced by the use of both special materials and special methods of casting. Formerly, charcoal iron was used exclusively for this class of work, but now coke iron enters largely into the mixture. The problem of a high-grade mixture has been much complicated by the necessity of remelting the old wheels, with their usual high content of sulphur. A partial corrective for the excessive amount of scrap which it is often necessary to use is found in the addition of ferro-manganese, and there have also been obtained some encouraging results through the use of ferro-titanium.

Methods of Casting Wheels

The special methods of casting consist in the use of a circular chill in that part of the mold forming the tread of the wheel. This method has been frequently described and needs no discussion. With the proper percentage of silicon this results in the tread being chilled to a depth of about ¾ inch, back of which is tough gray iron. The chilled tread is, of course, intensely hard and exceedingly resistant to wear, while the wheel as a whole is very tough and has proven eminently satisfactory in service. Steel wheels, long used on passenger cars, have recently been substituted on freight cars of very high capacity. They are, however, much more expensive and in some cases have not proven entirely satisfactory as to wear, so that there is every indication that the cast iron car wheel will hold its own for a long time to come.

The specifications and tests required for car wheels have been so often published and are so readily accessible that they need not be repeated at length. Briefly summarized the tests are carried out on a certain number of the castings themselves, and consist chiefly of a drop test to measure the resistance to shock and blows, a heat test made by pouring molten iron around the tread of the wheel, to measure the resistance to heat strains, and measurements to verify dimensions. It would appear that a hardness test on the chill might advantageously be added, in view of the known variation in the hardness of chilled iron. A test for wearing quality would be better still, but no satisfactory test of this sort is in sight.

Chilled Rolls for Rolling Mills

Cast iron rolls still hold their own in sheet mill and some other classes of finishing work, although cast iron has been quite generally displaced by steel for the heavier service. In this case the service conditions are not unlike those to which car wheels are subjected, but they are even more severe as to heat strains. Moreover, owing to the great thickness of the castings, the initial shrinkage strains are very great. The use of the very best grades of charcoal iron, together with air furnace melting, is generally recognized as necesary for the successful manufacture of chilled rolls, chiefly on account of the difficulty with cracking due to heat strains. It is reported that the use of vanadium in chilled rolls is adding considerably to their wearing qualities.

For this class of castings there are no satisfactory tests in sight. It is inconceivable that any tests could be of value which are not made on the roll itself, and, while a difficult proposition it is possible that in time a set of tests similar to those used on car wheels may be devised.

Brakeshoes may serve as an example of the many smaller specialties which are made of cast iron. The requirements here are long life, with this limitation: That the hardness of the brake-shoe must be less than that of the wheel so that the wear will not be on the wheel. A close grain structure is advisable, and in some cases at least is

being obtained by the use of steel scrap in the cupola mixture.

For brakeshoes a wearing test used in connection with hardness limits would best define their quality. No satisfactory method of testing resistance to wear is in sight, but it would seem that specifications for hardness alone could be advantageously used pending the development of such a test.

In point of tonnage, pipes are probably the most important castings made in this country. Cast iron is a particularly suitable material for pipes which are to be placed undergound, on account of its relative resistance to corrosion as compared with steel and other commercially available materials. Competition is keen in this line, so that low-priced iron is necessary. Within the limitations set by price, close grain and strength are desirable, while hardness must be kept within such limits as will permit of a small amount of machine work.

In regard to the properties of the metal, none of the present specifications for cast iron pipe lay stress on anything other than strength as determined on a separately cast test bar. A test for bursting strength and freedom from leakage made directly on the pipe would, of course, be a more accurate index of utility, but is probably too cumbersome for practical use. The transverse strength determination is probably as satisfactory as any simple test could be, but might with advantage be supplemented by specifying hardness limits.

Stoves and Furnace Work

Malleable cast iron and steel have been tried for stoves, but while they have perhaps a place, gray cast iron has proved more satisfactory and has steadfastly held its own. The service requirements here are resistance to the action of heat, resistance to warping, and a certain degree of strength. However, as these castings are very thin and are frequently highly ornamented, a very fluid iron is essential, and in practice the service requirements are deliberately ignored to facilitate manufacture. Resistance to heat requires low phosphorus, and resistance to permanent expansion, which causes warping, demands low silicon, but both phosphorus and silicon are invariably carried high in this class of work, to increase fluidity and make it easier to produce perfect castings. However, the product of our stove foundries is fairly satisfactory in service, and in appearance and finish has reached a high degree of perfection.

Specifications for stove and furnace castings should include tests for strength, hardness, since many parts have to be drilled, and resistance to heat. There is no trouble in regard to the first two tests, but, as previously stated, no good method has yet been devised for gaging heat-resistant qualities. Specification of chemical analysis can be used with advantage, but cannot be regarded as a really satisfactory substitute for the much-needed direct test for heat-resistance.

Commercial Tendencies in Malleable Practice[1]

By Richard Moldenke

As is well known, the production of malleable castings is carried out in America almost entirely with a view of obtaining the black-heart variety, while in Europe the white, steely fracture is the rule. The latter material may be readily machined and finished with little loss of strength, while the black-heart suffers seriously if the skin of the casting is removed. The differences lie primarily in the heat treatment given the two varieties of malleable castings, in the percentages of phosphorus and sulphur used, and finally in their subsequent uses.

The question of strength is not always a serious one in malleable casting work, so long as a casting is intended to be finished as part of a machine tool, or where the labor thus expended forms the principal item. Something a little better than cast iron is wanted, and the malleable casting machines easier than steel. Where, however, no labor whatever is intended to be expended upon the malleable casting, as is practically always the case with the black-heart American variety, there is a natural tendency toward making the least weight do the work.

Were this commercial consideration always accompanied with the proper understanding of the characteristics of the material involved, there would be no harm done. But where the consumer forces the manufacturer to take chances his better judgment would not sanction, then it becomes a serious matter. In the first case this continual demand for a better grade of material is a good thing for the development of an industry, since stricter specifications are made and methods of production are improved; in short, a pound of iron is made to go further in the service of man than it could before. On the other hand, the following may be said to apply: That in the entire range of the casting industry there is a present tendency toward running up the more striking characteristics of a material to a point of excellence at the expense of other, but none the less valuable properties. For instance, instead of making use of the ordinary malleable casting, as readily made from good irons under standard conditions, a grade of cast iron made with the plentiful addition of steel to the mixture, and advertised as semi-steel, is substituted on account of its lower cost. Again, instead of using the steel casting direct, where a high tensile strength is desired, a very-low-total-carbon malleable casting is made to do because it is cheaper.

The result of this short-sighted policy is the production of a series of supposedly high-grade materials which, in reality, are very unreliable. The principal sufferer is the consumer, who does not make any specifications, but gets the bulk of the metal that has to be made to satisfy the one who does. The latter, who may need only a limited quantity, asks for the almost impossible, and the product is probably entirely unsuited for general work.

Attention is directed to the above tendency in America at this time, because the exportation of black-heart malleable castings is beginning to be a factor in international trade. With a present American production of some 800,000 tons of these castings, and a capacity of over a million tons annually, there is bound to be some investigation on the part of consumers in other countries relative to the merits of the material in question. This in turn compels the

[1]Presented at the International Congress for Testing Materials.

producers of those countries to take notice and will naturally affect their practice.

So that the matter may be better understood, a few necessary details of production are given: In regular malleable melting practice, both in Europe and America, a limited amount of steel scrap is added to improve the material. This effects an initial reduction in the total carbon with a consequent increase in the tensile strength of the finished castings. With the very best of irons, short heats, first-class annealing conditions, and in fact the carrying-out of the processes which are calculated to give the best results, it is not possible to get a very high tensile strength without sacrificing some of the shock-resisting properties for which the malleable casting is justly famous. Thus, the ordinary blackheart product, as tested transversely by means of the 1-inch square test bar placed on supports 12 inches apart, should stand a load of 3,000 pounds applied at the center, and give a deflection of at least ½ inch, and in exceptionally good material the deflection may run even beyond 2½ inches. The tensile strength of such test bars will not run much over 42,000 pounds per square inch. It is quite possible, by a heavy initial reduction in the total carbon through steel scrap additions, to obtain tensile strengths of above 58,000 pounds per square inch, and when extreme care has been exercised in the melting and annealing processes to keep oxidation of the metal down to a minimum, the deflection will still be good. The chances are, however, so very much against this, even in the highest type establishments, that whoever insists upon this high-grade material and bases the calculation of his structures involving risk of life upon them makes a serious mistake. He had much better specify the steel casting in the first place.

As a mere item to show the delicacy of the manufacturing process there may be mentioned the fact, well known to the producer, but perhaps not at all to the consumer, that with composition and manufacturing processes identical up to this point, castings taken from saggers dumped on Monday morning—the one day when the annealing ovens are discharged cold—are much softer, bend and twist better, and are in every way more desirable as malleable castings, than those obtained the other days of the week. Yet the tensile strength of such castings is considerably below those dumped hot.

The malleable casting differs from all others in that any attempt to correct the oxidation of the metal in a heat before pouring so increases the expense that it cannot compete with cast steel. With the addition of much scrap steel to a charge, with the personal equation of the probable low type of melter, and with the probable variations in the annealing temperatures, an attempt to work for very high tensile strengths is not followed by reliable results. The chance of oxidizing the iron, in addition to the silicon and manganese, is such that a more or less open crystalline structure results, with consequent penetration of further oxygen during the annealing process, weakening the casting. This may be readily seen from the effect of changing to coke irons from the charcoal varieties. Charcoal irons, with their high total carbon and comparative freedom from oxidation as blown in the furnace, when compared with the coke irons, gave the foundryman a chance to obtain good castings in spite of slight unavoidable variations in his practice. In American practice, at least, the change to coke irons has compelled the raising of the silicon specified in pig irons, in order to avoid this chance of initial oxidation as much as possible.

Until we have better melting methods, possibly when the electric furnace has been sufficiently developed along lines of economical production and until we can obviate or cheaply correct any undue oxidation of the molten metal before it is cast, it would be wise to lay more particular stress upon the development of the malleable casting commercially along lines of greater softness rather than high strength. Where the latter is essential the steel casting is certain to replace it sooner or later. On the other hand, with the specifications so shaped that the resilience of the material is made prominent for ultimate development, the merits of this peculiar product of the casting industry will be brought out and the material kept in its proper sphere of usefulness.

Spiral Pipe

Reinforced galvanized spiral pipe which is made from two strips of steel of different widths and with a continuous interlocking seam, is manufactured by the Standard Spiral Pipe Works, 25 North Dearborn street, Chicago. This pipe is adapted for use in water supply lines, dust-collecting systems, for compressed air, exhaust steam, etc. Both strips of steel from which this pipe is made have the edges rolled to shape and are interlocked at high pressure. The strips of steel first are cut to the required width from steel sheets and the ends are welded together. The steel strips then are placed on large spools. The strip used for the outside or reinforcing band is delivered reeled in long lengths by the mills. Both of these strips are fed into the machine and are delivered at the opposite end in the form of spiral pipe. As the reinforcing band is on the outside of the pipe, the inside surface is entirely smooth. The reinforcing strip is neither welded nor soldered to the pipe, but is interlocked in the form of a continuous seam. Ample folds are made on both strips so that a large bearing surface or contact is obtained at the seam.

To test the strength of the seam a section of 18-inch, No. 20 reinforced spiral pipe was subjected to 235 pounds hydraulic pressure before the seam was opened. Galvanized reinforced spiral pipe is made in any required length up to 20 feet and asphalted pipe in lengths up to 25 feet. Slip sleeve joints made with a seamless sleeve welded into one end of the pipe are furnished and lugs also are welded on the outside of both ends. In making the connection one end of the pipe is slipped into the other and the section then is drawn together by wires slipped over the lugs. Forged steel flanges, electrically welded on the pipe, are furnished.

United States Leads in Coal Production

The United States has held first place among the coal-producing countries of the world since 1899, when this country supplanted Great Britain. In 1911 the total world's production of coal amounted to approximately 1,302,500,000 short tons, of which the United States contributed 496,221,168 tons, or 38.1 per cent, according to the United States geological survey. In the 12 years from 1899 to 1911 the production of the United States has increased over 250 per cent; from 1899 to 1911 Great Britain has increased its output about 50 per cent, from 198,146,731 to 304,521,195 tons. The United States in 1911 produced almost 500,000,000 tons, or 63 per cent more than Great Britain in 1911; Germany's production of coal and lignite in 1899 was 93,640,500 short tons; in 1911 it was 258,223,763 tons, an increase of over 175 per cent. The combined production of Great Britain and Germany in 1911 was 562,744,958 short tons, exceeding the United States by 3.2 Germany in 1911 was 562,744,958 short tons, exceeding the United States by 3.2 per cent.

The Uniform Nomenclature of Iron and Steel

Report of the Committee of the International Association for Testing Materials, With Official Definitions of Various Terms

With few exceptions, the definitions offered by the committee on Uniform Nomenclature of Iron and Steel of the International Association for Testing Materials, and presented at the New York congress, Sept. 2 to 7, were accepted by the various members of the committee and their adoption as a standard was recommended. In the opinion of a part of this committee two names, *steel* and *malleable cast iron*, require radical treatment. It also has been recommended that in the definition a statement of the apparatus in which the products are habitually made be specified. To meet these views the definitions have been supplemented with remarks clearly not defining, but cautionary in their nature, which explain how certain of these products are habitually made. The committee explained that such an explanation may be useful as an added safeguard against fraud, because an industrial contract presupposes that its own language is to be read in the light of existing industrial conditions and usage.

New Definitions

The new definitions proposed by the sixth congress follow:

Alloy steel.—Steel which owes its distinctive properties chiefly to some element or elements other than carbon, or jointly to such element and carbon. Some of the alloy steels necessarily contain an important percentage of carbon, even as much as 1.25 per cent. There is no agreement as to where the line between the alloy steels and the carbon steel shall be drawn.

Blister bar, cement bar, converter bar.—Bars of blister steel.

Blister steel.—Steel of plastic origin made by cementing wrought iron with carbonaceous matter. Also, commercially, such steel when heated and worked into merchant sizes. The blister steel of commerce is made by cementing very pure wrought iron with charcoal.

Carbon steel.—Steel which owes its distinctive properties chiefly to the carbon as distinguished from the other elements which it contains.

Cast iron.—Iron containing so much carbon that it is not usefully malleable at any temperature.

In America, besides the foregoing generic meaning, cast iron is used also in a specific sense which excludes pig iron and is restricted to cast iron in the form of castings other than pigs and to remelted cast iron suitable for such castings. The cast iron of commerce is reduced from the ore usually in the blast furnace in direct contact with solid carbon and then is tapped from the furnace in a molten state. It always contains an important percentage of carbon, usually from 2½ to 4½ per cent, and in most cases an important percentage of silicon.

Three chief varieties of cast iron are defined as follows:

Gray cast iron.—Relatively soft and characterized by the presence of graphite often forming an irregular skeleton. This is the variety used chiefly for engineering work.

White cast iron.—Extremely hard and brittle, characterized by having all or nearly all its carbon in the combined state and by its consequent lack of graphite.

Mottled cast iron.—Intermediate between gray and white iron.

Double-shear steel.—Shear steel made by piling, hammering and thus welding bars of single-shear steel into a bloom. Also the bars and other merchant shapes made by rolling or hammering such a bloom.

Ferro-alloys.—Iron so rich in some element or elements other than carbon that it is used primarily as a vehicle for introducing that element in the manufacture of iron and steel.

The ferro-alloys are not usefully malleable, and they usually contain more of the alloying element than is desirable in an alloy steel. With variations in industrial conditions the line between alloy steels and ferro-alloys must necessarily shift. A substance might simultaneously be an alloy steel in the machine shop and a ferro-alloy in the steel mill.

Iron castings.—Castings of cast iron. They are usually made from liquid iron direct from the blast furnace, or by remelting cast iron in a cupola or other furnace, or in crucibles.

Malleable cast iron.—Iron which is first cast as cast iron and later made malleable without remelting.

It is explained that commercial malleable iron is first cast as brittle white cast iron and then is made more or less malleable, either by converting most of its carbon from the state of cementite into that of temper graphite, or by removing most of it by oxidation, or both means jointly. In both cases the malleablizing is accomplished by close annealing, usually in contact with an oxidizing agent. Therefore, there are two classes of commercial malleable cast iron of which one owes its malleability to a large removal of carbon and the other to a large removal of carbon from the outer part of the casting and to the precipitation of much of the remaining carbon in the free or graphitic state. The British definition of malleable cast iron is iron which is first cast into molds and afterward made more or less malleable without remelting by close annealing, usually in contact with an oxidizing agent.

Mixer metal.—Molten cast iron which has been passed into or through a metal mixer.

Pig iron.—Cast iron which has been cast into pigs direct from the blast furnace or its equivalent. This name also is applied loosely to molten cast iron which is about to be so cast into pigs, or is in a condition in which it could readily be cast into pigs.

Plated bar.—Bars of blister steel which have been rolled or hammered while hot.

This treatment, which is usually applied to such bars broken to convenient lengths, flattens down their blisters and toughens the metal somewhat.

Semi-steel.—A vague trade name for various products near the border line between steel and cast iron. Among these are low carbon cast iron made in the air furnace or in the cupola furnace by the addition of steel scrap to the charge; also a trade name for malleable cast iron.

Single-shear steel.—Shear steel made by welding a pile of plated bars into a faggot. Also the bars and other merchant shapes made by rolling or hammering such a faggot.

Steel, fluid origin.—Iron which is cast from the molten state into a mass which is usefully malleable, initially at least in some one range of temperature.

The committee explained that such metal is steel whether it can be hardened or not, whether it contains much or little or even no carbon and for that matter even if it is chemically pure iron. It is sometimes called ingot metal. With the exception of blister steel and its derivatives, all of the

steels which have any industrial importance, including the alloy steels, fall under this definition.

These steels have been divided into the following classes:

Ingot iron.—Steel with enough carbon, say 0.30 per cent or more, to harden usefully on rapid cooling.

Steel made by melting in a crucible is called crucible steel, that made in an electric furnace is called electric steel.

Steel, plastic origin.—Iron which is aggregated from pasty particles without subsequent fusion; is malleable at least in some one range of temperature and contains enough carbon, 0.30 per cent or more, to harden usefully on rapid cooling from above its critical range.

Blister steel and its derivatives and a few other high carbon steels which are unimportant today are the only present steels covered by this definition.

Wrought iron.—Malleable iron which is aggregated from pasty particles without subsequent fusion, and contains so little carbon that it does not harden usefully when cooled rapidly.

It is explained that commercial wrought iron, though occasionally made directly from the ore, is usually made from cast iron by such removal of its carbon and silicon as to convert it at the high temperature used into pasty particles and by squeezing these together in a bath of cinder or slag into a coherent mass, which retains permanently an important quantity of that slag. In Great Britain malleable iron is often used as synonymous with wrought iron, but the use of the term malleable iron is advised against.

The committee is divided concerning two anomalies in present nomenclature. These include what is called *malleable cast iron*, which lacks the essential defining property of other cast iron and lack of useful malleableness at all temperatures; and blister steel which lacks the essential and defining property of other steel, as it is cast from a molten state into a mass initially malleable. A part of the committee proposed, but the minority opposed taking the initial steps to rid first scientific, then technical and finally industrial nomenclature of these anomalies, by removing malleable cast iron from the class *cast iron* and blister steel from the class *steel* and giving these species new distinctive and specific names.

The committee is of the opinion that for the purpose of a strictly scientific nomenclature as distinguished from industrial nomenclature malleable cast iron ought to be removed from the class *cast iron.*

The committee also is of the opinion that while in Great Britain the name has become so firmly attached to blister steel and the allied substances of plastic origin, that it is inconsistent to attempt now to remove them from the class *steel* in industrial, commercial, and colloquial usage at least in that country, yet such removal is desirable for the purposes of a strictly scientific usage, which should adopt the dominant defining characteristics of steel—the combination of malleableness with fluid origin—and should reject the co-existing but inconsistent defining property —the hardening power.

The officers of this committee are as follows: Henry M. Howe, New York, chairman; L. Levy, Paris, and D. Tschernoff, St. Petersburg, vice chairmen, and A. Sauveur, Boston, secretary.

Reviews of New Catalogs

LABORATORY LATHES. — The Emerson Electric Mfg. Co., St. Louis, in an eight-page circular, illustrates and describes a line of laboratory lathes for alternating and direct currents. Two distinct styles are shown.

CHAIN HOISTS.—A 16-page catalog, issued by the Wright Mfg. Co., Lisbon, O., is devoted to its line of high-speed hoists. These are made in various sizes from 1 to 25 tons. The load on these hoists is held in any position by an automatic friction device, but can be lowered instantly by a slight downward pull on the hand chain.

CORRUGATED FURNACES. — A 36-page booklet, issued by the Continental Iron Works, Borough of Brooklyn, New York City, is devoted to corrugated steel furnaces for stationary, marine and locomotive engine boilers. Sectional views of various types of boiler furnaces for marine purposes are included, together with a large number of stationary furnaces.

WOOD PRESERVING MACHINERY.—A 22-page catalog issued by the Power & Mining Machinery Co., 115 Broadway, New York City, is devoted to its extensive line of wood preserving machinery, including steel impregnating cylinders, storage, charging, measuring and underground emptying tanks, vacuum pumps and condensers, centrifugal pumps, air compressors, feed water heaters, etc.

VISES AND PUMPS.—A well-illustrated, 40-page catalog, issued by the Fulton Machine & Vise Co., Lowville, N. Y., is devoted to its extensive line of vises, centrifugal pumps, truing lathes, etc. A large number of different types of vises are shown adapted for practically all shop purposes. Centrifugal pumps, both horizontal and vertical, and either motor or belt-driven, are illustrated.

VALVE FITTINGS, ETC. — The extensive line of brass and iron goods and specialties for steam, gas, water and oil, manufactured by the Kelly & Jones Co., Greensburg, Pa., is illustrated and described in an exceedingly comprehensive, 466-page catalog, recently issued. In addition to the products listed considerable space is devoted to tables and useful data for steam plant engineers.

ELECTRIC LOCOMOTIVES. — A 64-page catalog, issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is devoted to Baldwin-Westinghouse electric locomotives. The use of these machines in various classes of service is shown and details of their construction are included. Various types of locomotives are illustrated, used not only in traction service, but for switching cars at industrial plants.

CONCRETE. — *Universal Bulletin*, for August, published by the Universal Portland Cement Co., Chicago, contains a number of interesting illustrated articles, dealing with the use of concrete in various structures. Prominence is given to the concrete grain elevators in process of erection at Chicago, for the Quaker Oats Co. Results of experiments on concrete I-beams are given, and the results attending some bulk shipments of cement are of especial interest.

MECHANICAL TOOLS.—In an exceedingly comprehensive, 274-page catalog, the L. S. Starrett Co., Athol, Mass., illustrates and describes its extensive line of fine mechanical tools. These include rules of various types, T-squares, steel tapes, combination sets, calipers, micrometers, bevels, gages, clamps, test indicators, hack saws and frames, plumb bobs, nippers, pivers, dividers, punches, screw drivers, etc. A large number of tables are published and a well-arranged index is included.

PIPE FLANGING.—The hydraulic, cold extension pipe flanging process is discussed in a 16-page booklet, issued by the Patterson-Allen Engineering Co., New York City. Views of the machines employed for attaching the flanges by the Patterson-Allen process are shown, together with different types of flange joints. A hydraulic flanging machine also is illustrated, together with a device for parelleling flange faces and for lining-up bolt holes. Pressed steel boiler nozzles and forged steel valves also are shown.

TROPENAS CONVERTERS. — "Tropenas Converters at Panama" is the title of an interesting booklet issued by the Tropenas Converter Co., New York City, which briefly contains a history of the Panama Canal, an outline of how it is being built, together with a resume of the cost of making steel castings in the canal zone by the Panama canal commission. In the gray iron foundry operated at Gorgona a Tropenas converter has been installed which will permit the government to make steel castings for necessary canal repairs and replacements.

FOUNDRY SUPPLIES AND EQUIPMENT.—A pocket edition of the foundry supply and equipment catalog and price list of the S. Obermayer Co., Chicago, recently has been issued and should prove exceedingly convenient to foundrymen generally, who desire to carry a copy of this reference work with them while in the shop. The catalog contains 321 pages and a well-arranged index adds to its attractiveness. The entire line of supplies required in gray iron, steel, malleable and brass foundry operations is illustrated and described, together with the necessary equipment for these shops. A price list also is included, together with a large number of tables and handy information for foundrymen.

FIG. 1—CUTTING AND BENDING DEPARTMENT

FIG. 2—A VIEW OF THE DRILLING DEPARTMENT

The Manufacture of Steel Flasks

Steel is rapidly replacing wood in the construction of foundry flasks and to meet the increasing requirements for this steel foundry equipment, the Sterling Wheelbarrow Co., West Allis, Wis., about four years ago engaged in the manufacture of steel flasks made of a special rolled section. Up to the present time approximately 50,000 flasks have been made and a large department is devoted exclusively to this line of work. The rolled steel shape used in the construction of these flasks is a reinforced channel section made in seven widths from 2½ to 8 inches. This permits of the manufacture of a wide variety of sizes from 12 x 12 inches with a 2½-inch cope and drag, to 24 x 60 inches, with an 8-inch cope and drag. More than 2,000 different sizes are made which are graduated in inches and the sizes in fractions of inches enormously increase this tool.

The equipment of the department devoted to this work is unusually complete as shown in the accompanying illustrations. Fig. 1 illustrates the machinery utilized for cutting and bending the rolled sections which are received in 20-foot lengths. In addition to the two large presses shown in the foreground, the necessary dies for cutting and bending the several different widths of material complete the equipment of this department. After the material has been cut and bent it is laid out and punched for the innumerable pinholders and reinforcements necessary to meet the requirements of each individual order. The trimmings usually vary, as hardly any two foundries follow the same practice in flask design.

In Fig. 2 is illustrated the drilling department in which the holes in the flasks and trimmings are drilled. In each flask and its trimmings there are never less than 64 holes and as high as 260 holes are required on flasks of certain styles. The power-operated riveting machines which drive an average of 2,000 rivets an hour are illustrated in Fig. 3. These machines attach the trimmings and reinforcements to the flasks. The initial finishing operation consists of squaring and truing the flasks. The final finishing operation consists of drilling pin holes and attaching pins. A view of this department is illustrated in Fig. 4. Several different sizes of pins and various clearances are required to meet the many demands of the foundry trade. The output of the plant is 100 flasks per day.

History of the Saw

The saw is the earliest tool that has been traced in Egyptian history. It was first found in the form of a notched bronze knife in the third dynasty, or about 5,000 B. C., and was followed by larger toothed saws in the fourth to sixth dynasties, which were used by carpenters. There are no dated specimens, however, until the seventh century, B. C., when the Assyrians used iron saws. The first knives on record were made out of flint, and were really saws with minute teeth. Rasps, which are but a form of saw, were first made of sheets of bronze punched and coiled round, but the Assyrians in the seventh century used the straight rasp made of iron, exactly like the modern type. The saw is possibly used more than any other tool.

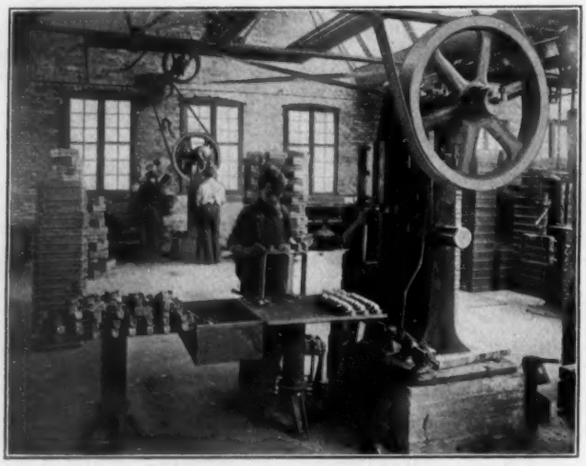


FIG. 3—THE RIVETING DEPARTMENT

FIG. 4—DEPARTMENT FOR DRILLING PIN HOLES AND ATTACHING PINS

LABOR LEGISLATION

Causes Much Trouble in England—Minimum Wage Act.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., Aug. 28.

At recent company meetings, complaint has been universal of the injury done by the recent coal and transport strikes. The Great Western Railway Co.'s chairman spoke of a decrease of £234,343 as being due to the coal strike, which, he said, had resulted in an enormous loss to the trade of the country and in the sacrifice of many millions in wages to the workmen. At all the railway meetings and at nearly every other company meeting, similar jeremiads have been indulged in, coupled with laments at the difficulty of economizing working costs owing to the burdens placed upon employers by the insurance act. The coal strike and other labor troubles, it was reported at the meeting of the Cardiff Railway Co., involved a loss of about a million tons of traffic to the Cardiff docks during the last half year. No dividend has been earned on the ordinary shares and the preference dividend has only been paid by the Marquis of Bute, who owns the controlling interest, foregoing the royalties and other payments due to him. The minimum wage act passed this year to settle the coal strike is working in many districts in a way which has caused great dissatisfaction among the miners and a conference was held this week to demand a revision of a number of the awards. Although the premier, Mr. Asquith, has declared that the act is working on the whole, satisfactorily, it will not be surprising if the miners agitate strongly for its revision. In the meantime, some extensive local stoppages are feared as the result of the men's dissatisfaction with the minimums awarded by district boards, which, in many cases, are less than the expected 5 shillings per day, and, still more, with the interpretation which is being put upon the awards by some of the employers.

The Steel Co. of Scotland, after writing off in the past half year's accounts £27,551 for special expenditure, proposes to add £25,000 to the reserve fund, pay a dividend of 10 per cent and carry forward £19,000. Twelve months ago, the dividend was 6 per cent.

The Workington Iron Co. (Cumberland), has declared a dividend at the rate of 6 per cent per annum for the half year ended June 30 last, on the preference shares.

The Portuguese trade has decided to establish a metal industry in this country. Steel and copper foundries are to be set up on a large scale. William Scott, a British engineer, has left for London with the object of raising a loan of £1,800,000 among British bankers for this purpose.

EXPECT REPORT

On Alleged Coke Combine In Several Weeks.

It will be several weeks before a definite report is filed with federal authorities at Washington concerning the alleged attempt on the part of a number of coke producers in the Connellsville region to obtain the once-proposed $2.50 price on furnace coke.

Just what this report will advise is still undecided. It is known that considerable difficulty has been experienced in obtaining evidence against coke sellers, and those making the investigation have decided that newspaper reports, which were sent the department of justice at Washington, were greatly exaggerated. It was upon these reports, it is announced, that the federal government was led to make an investigation.

Leading coke producers, several of whom are claimed to have entered the alleged combination to obtain $2.50 for coke, have been questioned by representatives of the department of justice, and it is said they have not hesitated to furnish information desired by those carrying out the probe. Government officials also have visited coke oven operators in the Connellsville and Uniontown districts, in an effort to obtain additional information.

Although it is claimed an attempt was made to curtail the production of coke, data furnished government officials making the investigation indicated that consumers were able to obtain desired tonnages, and that shipments of coke did not fall off to any great extent.

Spanish Ore Trade

Concerning the rising price for Spanish ore, the Middlesbrough, Eng., correspondent of the *Ironmonger* says: says:

"In rubio ore some sales have been made at 22s per ton for delivery extending into the first few months of next year, but sellers are now generally quoting 22s 6d consequent upon the high rates of freight. The current figure for Bilbao-Middlesbrough is 6s 10½d.

LARGE ORE DEPOSITS

Proved Up in Ausable District of New York.—Other Development Work.

Present indications point to enlarged activity of iron ore mining in New York state during the next year, if the present more favorable state of the iron trade continues. In some sections of the state, some important preliminary work and improvements of plants are now under way.

Considerable prospecting and diamond drilling work has recently been done and is now continuing in the Ausable district in Clinton county, and these investigations have disclosed the presence of a large body of medium grade iron ore which is very suitable for concentration as Bessemer and low phosphorus material. Witherbee, Sherman & Co., the leading Port Henry operators, control the Ausable deposits which are of an extensive area and they are conducting the present prospecting and testing work. No definite announcements have yet been made as to the plans for the development of these properties.

Witherbee, Sherman & Co. are now putting the finishing touches upon their new No. 4 concentrating mill, at Mineville, N. Y., in the Port Henry district, which is being built for the treatment of Barton Hill low phosphorus ores. The new mill, which is one of the most modern and best equipped plants in the country, will produce Bessemer concentrates. It has a capacity for treating approximately 1,500 tons of crude ore daily. Operations are expected to be inaugurated sometime in November.

At the Benson mines in the Utica district, the installation of a new concentrating mill and plant continues under way and this property will probably be in the shipping class before many months. In the Port Henry district, present activities are confined to the development of regular operations and no preliminary or prospecting work is now being carried on.

Suspends Higher Iron Rate

The proposed advances in the freight rate on pig iron from a number of blast furnaces in Virginia to Philadelphia have been suspended from Sept. 1, until Dec. 30, through an order issued at Washington by the interstate commerce commission. The new tariffs attempted to cancel the lower rate previously in effect on the Chesapeake & Ohio and the Norfolk & Western via Norfolk, Va., to meet the water competition.

THE IRON TRADE REVIEW

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Cleveland, September 5, 1912

Our Heavy Steel Exports

While iron and steel exports in the fiscal year ended last June made a remarkable record, the rate attained in the last three months of the fiscal year was considerably above the average in the nine preceding months. The full details, by months and items, were given in our monthly review of the foreign commerce in iron and steel, published in our issue of Aug. 8. A condensed showing by quarters follows, giving the weight of the tonnage lines exported, and also the value of all iron and steel exports, including the value of the tonnage lines as well as the value of hardware, cutlery, machinery, etc., not including agricultural implements or iron ore:

FISCAL YEAR.	GROSS TONS.	TOTAL VALUE.
First quarter	521,945	$59,290,630
Second quarter	564,713	63,533,966
Third quarter	574,870	64,728,283
Fourth quarter	848,153	79,635,902
Year	2,509,791	$268,154,262

The exports of tonnage lines in the June quarter were at the rate of 3,400,000 gross tons annually, against an average rate of 2,200,000 tons during the three preceding quarters. The total value in the June quarter was at the rate of $320,000,000 annually, against an average of $250,000,000 in the three preceding quarters.

Iron and steel exports, both as to tonnage and total value, have been growing by leaps and bounds in the past three years. A brief statement as to the tonnage is that while in 1900 there were exports of 1,154,284 gross tons, the material running largely to pig iron and unfinished steel, the total dropped to 326,590 tons in 1903, and then averaged a trifle over a million tons from 1904 to 1909, inclusive, increasing to 1,535,698 tons in the calendar year 1910, 1,914,127 tons in the fiscal year 1911, 2,187,809 tons in the calendar year 1911 and now 2,509,791 tons in the fiscal year 1912, but with a rate of 3,400,000 tons in the closing three months of that fiscal year.

The tonnage exports do not furnish the chief value in our total iron and steel exports. From 1904 to 1910, inclusive, the tonnage lines furnished an average of about 31 per cent of the total value, 1904 showing the highest proportion, with a trifle over 33 per cent, and 1908 the lowest, with a trifle under 29 per cent. In 1911, the tonnage exports furnished almost 35 per cent of the total value. Our exports of non-tonnage lines, particularly of machinery of various descriptions, are very large, single items running into millions of dollars in a year, as, for instance, in the fiscal year just ended, $10,000,000 for sewing machines, $11,000,000 for typewriters, $3,600,000 for cash registers, $3,400,000 for firearms, $3,300,000 for locomotives, and so on.

The total value of all iron and steel exports (exclusive of iron ore and agricultural implements) averaged about $100,000,000 from 1898 to 1903, inclusive, rising steadily to $200,000,000 in 1907, but dropping back to $150,000,000 in the next two years. In 1910, $200,000,000 was attained again, and $250,000,000 was reached in 1911, while in the quarter just ended the rate was at $320,000,000 annually.

While our iron and steel exports are well distributed through a great variety of lines, there is a feature which is not frequently brought out, and yet it is one which is of particular interest at this stage in the progress of public thought, and that is that the exports are most striking in the products which are made by very large manufacturers. They have the facilities for building up an export trade which others have not, and thus we find that, as already suggested, typewriters, sewing machines, locomotives, cash registers, and the like, loom very large. Our agricultural implement exports, not classified by the Treasury Department under iron and steel, are also very large, amounting to between $35,000,000 and $36,000,000 in each of the last two fiscal years. It is well known that our steel exports are made chiefly by the United States Steel Corporation, although of the total production of the country it furnishes only between 50 and 60 per cent. There is nothing anomalous in this fact, as is shown by investigation into the distribution of the non-tonnage lines.

Striking at the Heart of Patent Law

The decision of the United States supreme court in the now famous Dick patent case, was announced on March 11, 1912, and on April 8, the grant of a rehearing was refused. This decision was unquestionably one of the most important in years, among patent cases. And while the reports of the case made public at the time frequently led one to believe that justice had miscarried, it now appears from the true version of the affair, that the result was to have been expected and that the decision was in line with the principles upon and the purposes for which our patent system was founded. These facts are brought out forcibly in a wonderfully clear discussion of the case by Gilbert H. Montague, of the New York bar.

According to Mr. Montague, the Dick company

owned patents covering a mimeograph. It sold to a certain person a mimeograph embodying the invention covered by these patents, subject, however, to a license, printed and attached to the machine and reading as follows:

LICENSE RESTRICTION.

THIS MACHINE IS SOLD BY THE A. B. DICK CO. WITH THE LICENSE RESTRICTION THAT IT MAY BE USED ONLY WITH THE STENCIL PAPER, INK AND OTHER SUPPLIES MADE BY THE A. B. DICK CO., CHICAGO, U. S. A.

Another firm sold to the owner of this machine some ink suitable for use upon the machine, with knowledge of this license restriction under which the machine had been purchased, and with the expectation that the ink would be used with this mimeograph. The question presented to the court was: Did the acts of this firm constitute contributary infringement of the Dick company's patents? The supreme court decided that they did.

It is not necessary here to go further into the details of the court's decision. For those and other data, we refer those interested to the full text of Mr. Montague's paper that appeared in the *Engineering Magazine* for May and June, 1912. Suffice it to say that the decision is in keeping with previous decisions in patent cases in this country and England, the latter having the only patent law developed before ours.

The important and serious matter is, that the decision has been the signal for the framing of numerous bills in congress, many of which prohibit, in one form or another, every kind of so-called "license restriction". The "license restriction", as construed by the supreme court these many years, is an inseparable portion of the exclusive rights conferred by the constitution, through the means of the patent law, upon authors and inventors for a limited time. It is generally admitted, both at home and abroad, that American superiority, in respect to machinery and tools at least, is directly due to the patent system. There can be little question then, but that many of these bills, now before congress, are direct blows at the very heart of our patent law, a law that has been instrumental beyond computation, in bringing American methods and products to their present advanced state of superiority. Is it not well to pause for serious thought before actually striking such a blow?

A tendency of present times is a general desire on the part of many for a change in existing methods, customs and laws. No doubt some of the many changes, in force and proposed, will work for the correction of past and present abuses, and if so, well and good. The mere desire for a change, however, simply because it is a change, is not commendable and is certainly dangerous when it involves basic principles that have been tried for many years with acknowledged beneficial results. Changes in our patent law should be contemplated only with the fullest knowledge of the facts and with due consideration for the far-reaching effects of that law.

Railrod Consumption of Steel

It is possible to make some estimate of the quantity of iron and steel being consumed by the railroads this year as contrasted with their consumption last year. The car output of the year appears to be fairly well determined. The car shops have increased their operations up to a certain point and, owing to the extreme difficulty of securing more labor, are content to continue operations at their present rate, so that the year's freight car output can be approximated roughly at between 175,000 and 200,000 cars, which contrasts with 55,931 cars built in 1911, according to the statistics of the *Railway Age Gazette*, published at the close of the year. As the trend is still more towards steel cars of large capacity, when the number of cars promises to be more than tripled, the quantity of steel consumed promises to be more than quadrupled. The car shops are likely to use fully 2,500,000 gross tons of iron and steel this year, against less than a fourth as much last year.

Last year, the steam roads did not use more than about 2,000,000 tons of rails, this being what is left of the 2,822,790 tons of production after allowance has been made for exports and the use of rails by industrial and electric enterprises. This year, the quantity should easily reach 3,000,000 tons, a gain of one-half or more.

Only a rough estimate can be made of railroad consumption of structural material, but it can be noted that the total production of structural shapes last year was particularly small, and the proportion going into railroad was known to be unusually low. This year, the total structural tonnage is very large, and the proportion going into railroad work is at least normal, so that there is probably a gain of several hundred thousand tons.

Railroad consumption has undergone a large increase in other items of iron and steel, car repair material, track material, block signaling, etc. Making allowance as closely as possible for the various items, the general estimate is probably not far out of the way that the railroads last year used 5,000,000 gross tons of iron and steel and are this year using nearly, if not quite, 10,000,000 tons. While this represents approximately a doubling in the tonnage, it does not represent a doubling in the proportion of the total output taken by the railroads, because the total output undergoes a large increase. Roundly speaking, it may be estimated that in 1911 the railroads took about 20 per cent of the total output of rolled and cast iron and steel, while this year they are taking about 30 per cent, the total production itself increasing 35 or 40 per cent.

The increased percentage of this year does not, of course, represent a return to the proportions of 40 to 60 per cent which obtained from 20 to 30 years ago, when the railroads were being built and when consumption of iron and steel in other lines of activity was relatively limited. The old proportion can never recur, there being too many other mouths to satisfy. It should be remembered also that there is now a large export trade, absorbing now from 10 to 15 per cent of our total production. It may represent railroad material to a large extent, but this is not consumption by the railroads of the United States, which is the item under discussion.

MEN OF THE IRON TRADE

Joseph B. Andrews, of the Andrews Steel Co., Newport, Ky., is spending a vacation with his family at Oden, Mich.

C. W. Scofield, secretary of the Lake Erie Iron Co., Cleveland, will sail this week on a several weeks' sojourn in Europe.

John M. Jones, director of service at the Youngstown Sheet & Tube Co., Youngstown, O., has recently returned from a 12 weeks' trip to Wales, where he formerly lived.

R. H. Rehm, who has been associated with the Richmond Iron Works, Richmond Furnace, Mass., will sever his connection with that company on Oct. 1.

John W. Branton, who has been general foreman of the Illinois Central railroad at Mounds, Ill., has been appointed master mechanic of the Centralia district, with office at Centralia, Ill.

B. N. Osbun has resigned as president of the Boss Nut Co., Chicago, to become president and treasurer of the Auto Refrigerator Co., of that city. J. T. Benedict succeeds Mr. Osbun as president of the Boss company.

George M. Thompson, superintendent of the Spencer Wire Co., Worcester, Mass., returned from a two-months' tour of Europe last week, and was given a dinner by heads of the various departments in the company's mills.

C. H. Hallgath has resigned as sales manager of the Wheeling Corrugating Co., at Chicago, effective Sept. 1. He has been appointed western sales manager of the Carnahan Tin Plate & Sheet Co., Canton, O., with headquarters at Chicago.

L. H. Carlisle, formerly connected with the Carnegie Steel Co., has been appointed sales manager of the Cambria Steel Co., Johnstown, Pa. Alex P. Robinson, of Philadelphia, vice president and treasurer of the Cambria company, recently inspected the plant.

Clarence H. Howard, president of the Commonwealth Steel Co., St. Louis, has been elected a director in the Boatmen's bank, of that city, to succeed Robert McKittrick Jones, resigned. Mr. Howard has been identified with railway, steel and foundry corporations in St. Louis for a number of years. He has been president of the Commonwealth Steel Co. since 1906.

Charles B. Foster, Westline, Mass., is president of the reorganized Morgan Motor Truck Co., Worcester, Mass. Other officers chosen are: Treasurer, Evan F. Jones; directors, Jerome R. George, John E. Bradley, Charles B. Foster and Lancaster P. Clark. The capital stock has been reduced from $1,100,000 to $300,000.

Louis Wilputte, formerly manager of the H. Koppers Co.'s American branch, has been elected vice president of the United Coke & Gas Co., 17 Battery place, New York. This company has the agency for the sale of the Otto Hoffman oven in this country.

John Kagarise, general superintendent of the open-hearth department of the north and south works of the Carnegie Steel Co., at Sharon, Pa., was transferred Sept. 1, to the Edgar Thomson works at Braddock, Pa., where the company is building 14 new furnaces.

E. W. Christy, formerly instructor in wood working and pattern making at Woodward High School, Cincinnati, was appointed supervisor of manual training in the Cincinnati public schools, to succeed F. P. Ball, recently resigned. Mr. Christy assumed his new duties Sept. 3.

Charles E. Carlson was elected secretary of the Duluth, Missabe & Northern Railway Co. at a special meeting of the board of directors held last week. He succeeds A. T. Banning Jr., who resigned to engage in the private practice of law. The election became effective Sept. 1.

Joseph E. Martin, who has been in charge of the boring mill and estimating departments of the Bullard Machine Tool Co., Bridgeport, Conn., has resigned to accept the superintendency of the Foster Engineering Co., Newark, N. J. Mr. Martin has been associated with the Bullard company for eight years.

W. L. Upton and Charles E. Ard have formed the firm of Upton & Ard, consulting and constructing engineers, Birmingham, Ala. They will specialize in the development and application of power for public service or private industries, including not only power plants but buildings and structures incident to such application of power.

H. C. Knowles has been elected a director of the Petroleum Iron Works Co., Sharon, Pa., and other members of the directorate were re-elected. Officers chosen at the annual meeting last week were: C. H. Todd, president; John L. Considine, vice president; P. J. Sweeney, secretary and treasurer, and H. C. Knowles, assistant secretary and treasurer.

John I. Souther has resigned as superintendent of blast furnaces for the Cambria Steel Co., Johnstown, Pa. R. C. Glazier, who has acted as assistant superintendent, has been named Mr. Souther's successor. The Cambria company announces that Merrill G. Baker has been appointed as an assistant general manager of sales in charge of shapes and plates, and that E. J. Dotterer also has been appointed an assistant general manager of sales, in charge of merchant bar products.

James A. Campbell was re-elected president of the Youngstown Sheet & Tube Co., Youngstown, O., at a meeting of the board of directors held last week. Other officers chosen by the board are first vice president, H. G. Dalton, Cleveland; second vice president, C. S. Robinson; treasurer, Richard Garlick; secretary, George E. Day; auditor, John Brant. These officers were all re-elected with the exception of the auditor. Mr. Brant, who has been acting auditor since ill health compelled the retirement of W. B. Jones, was elected to that position.

R. W. Knight, contracting engineer of the McClintic-Marshall Construction Co., Pittsburgh, has resigned to become interested in a new company which will build a steel fabricating plant near Welland, Ont. The new plant will start operations in November and will have an initial capacity of 600 tons of fabricated material a month. E. O. C. Kuhnel, works manager of the McClintic-Marshall company's plant at Carnegie, Pa., is associated with Mr. Knight in the new undertaking. Mr. Knight who has been with the company since its organization 12 years ago, will be succeeded by R. B. Titsworth, the company's contracting engineer at Detroit. Mr. Titsworth will be suc-

MEN OF THE IRON TRADE

ceeded by F. U. Kennedy, of the Philadelphia office, and T. L. Cannon, of the Rankin, Pa., plant, has been named Mr. Kuhnel's successor.

F. H. Wheeler, Indianapolis, is president of the newly-organized Mais Motor Truck Co., Indianapolis. W. H. Pearce, Rushville, Ind., has been elected vice president and A. S. Lockard, Indianapolis, has been chosen secretary and treasurer. With H. G. Francis and J. V. Stimson, these officers comprise the board of directors. The company is a reorganization of the old Mais Motor Truck Co.

C. E. Eales, manager of the Wire Products Import Co., 2 and 4 Stone street, New York City, has just returned from a trip to England in the interests of the company. The Wire Products Import Co. was organized about a year ago to act as American representative of W. H. Glover & Co., St. Helen's, Eng., manufacturer of wire rope for marine purposes.

Chas S. Bird and Samuel C. Barnes have become associated with the engineering department of the Thos. W. Pangborn Co., Hagerstown, Md. Mr. Bird has been appointed assistant mechanical engineer and Mr. Barnes becomes a member of the general engineering staff. Mr. Bird for several years was associated with the American Steel Foundries, originally in the capacity of engineer and later as assistant manager of the Alliance, O., plant. Mr. Barnes for about 10 years was identified with the engineering department of the Frick Co., Waynesboro, Pa.

OBITUARIES

David M. Forker, who for some years was manager of sales for the Republic Iron & Steel Co., with headquarters at Birmingham, Ala., immediately after the Republic company was organized and later was in charge of the company's Cincinnati offices until two years ago he became identified with the D. T. Williams Valve Co., of Cincinnati, died Aug. 29, at his home on Wold avenue, that city.

Mr. Forker was born Feb. 2, 1860, in Mercer, Mercer county, Pa., a son of Joseph and Mary Mathews Forker. When a mere child relatives took him to Pulaski, Pa., where he was reared, his mother dying when he was very young. He attended Allegheny college at Meadville, Pa. Shortly after leaving college he entered the employ of a bank at Youngstown, O., where he met H. H. Hassinger, of Birmingham, Ala., who was interested in the iron business in the south. He and Mr. Hassinger organized and put into operation what was known as the Gates City rolling mill, at Gates City, Ala., a suburb of Birmingham, the concern being very successful. When the Republic Iron & Steel Co. was first organized, it took over the Gates City mill and Mr. Forker became manager of sales for the southern district with headquarters at Birmingham. He was later placed in like position with the company in its Cincinnati office, and still later in the Pittsburgh office. About two years ago he resigned his position with the Republic company and acquired a large interest in the D. T. Williams Valve Co., Cincinnati, of which he was vice president at the time of his death.

Mr. Forker was extensively known in the iron trade, both north and south, his sterling and upright business qualifications securing the friendship and esteem of all with whom he came in contact. In October, 1895, he married Miss Annie D. McClure, daughter of Hon. and Mrs. Samuel McClure, of Sharon, Pa. After leaving Birmingham, Mr. Forker secured a permanent home in Cincinnati, where he resided at the time of his death. Mr. Forker is survived by his widow and three children. Interment was made in Oakwood cemetery, Sharon, Pa., on Tuesday.

DAVID M. FORKER

Formerly manager of sales for Republic Iron & Steel Co., at Birmingham, and later with D. T. Williams Valve Co., who died Aug. 29.

Thomas Stengel, 57 years old, for many years connected in official capacities with the Jones & Laughlin Steel Co., the Crucible Steel Co. of America, and the Pittsburgh Tool, Steel & Wire Co., died a few days ago at Pittsburgh.

George Welsh, assistant purchasing agent for the Westinghouse Air Brake Co., Pittsburgh, until about five years ago, died last week at his home in that city after an illness of four or five months. He was a son of the late T. W. Welsh, who was superintendent of the Westinghouse Air Brake Co. from the time of its organization until his death, about 10 years ago.

Charles F. Putnam, president of the Putnam Machine Co., Fitchburg, Mass., died Aug. 30, at his summer home at Massapequa, L. I., after several months' illness. He was 67 years old. Mr. Putnam entered the machine shop of the Putnam company, which had been organized by his father, immediately after completing his schooling. We was elected president of the company following his father's death.

First Statistical Report of American Institute

Gives Production of Finished Materials for First Half of Last Year —Increase Compared With Half of Production of Preceding Year

The first semi-annual statistical report of the American Iron and Steel Institute, consisting of a preliminary summary of statistics of production of steel ingots and castings and iron and steel finished rolled products for the first six months of 1912, has just been completed. Heretofore statistics of finished materials have been published annually by the American Iron and Steel Association. The report, which was prepared by Howard H. Cook, assistant secretary and statistician, is as follows:

On July 1, 1912, statistical schedules were sent to all steel works and rolling mills in the United States asking for a return of the production of steel ingots and castings, rails and all iron and steel rolled products for the first six months of 1912. The results have been tabulated and are set forth in the following summary statement in order to secure immediate publication. A more elaborate analysis of the results, together with a study of the statistics of finished rolled products, is in course of preparation and will be published in the near future.

Steel Ingots and Castings

The total production of all kinds of steel ingots and castings for the first six months of 1912, was 14,373,701 gross tons, of which 9,441,706 gross tons consisted of open hearth steel, 4,868,305 gross tons of acid Bessemer steel and 63,689 gross tons of all other kinds of ingots and castings.

The total pig iron production did not vary greatly in the first half and in the last half of the year 1911, being 11,666,996 gross tons for the first six months as compared with 11,982,551 gross tons for the remainder of the year. It would seem fair, therefore, to make comparisons between the ingot production for the first half of 1912, and one half of the ingot production of 1911. It should be borne in mind, however, that such comparisons are only approximately correct. On this basis the total production of ingots and castings for the first six months of 1912, shows an increase over the estimate for the similar period of 1911, of 2,535,648 gross tons, comprising an increase of 1,642,381 gross tons of open-hearth steel and 894,379 gross tons of Bessemer steel, and a decrease of 1,112 gross tons of all other steel.

The accompanying table shows the production of steel for the five years 1907-1911, and for the first six months of 1912.

Total Production of Ingots and Castings.

	Open Hearth	Bessemer	All Other	Total
1907	11,549,736	11,667,549	145,309	23,362,594
1908	7,836,729	6,116,755	69,763	14,023,247
1909	14,493,936	9,330,783	130,302	23,955,021
1910	16,504,509	9,412,772	177,638	26,094,919
1911	15,598,650	7,947,854	129,602	23,676,106
1912 (6 mos.)	9,441,706	4,858,306	63,689	14,373,701

Separating the total production into its constituent parts, ingots and castings, the total production of ingots for the first six months of 1912 was 13,883,483 gross tons, of which 8,992,860 gross tons were open-hearth, 4,838,765 gross tons Bessemer and 51,858 gross tons all other kinds of steel. Compared with one-half the production of 1911, there was an increase of 2,368,744 gross tons of ingots of which 1,479,131 gross tons were open-hearth steel, 893,389 gross tons Bessemer steel, offset by a decrease of 3,776 gross tons in all other steel.

Total Production of Ingots.

	Open Hearth	Bessemer	All Other	Total
1907	10,803,211	11,634,276	121,990	22,559,477
1908	7,524,952	6,096,196	55,879	13,677,027
1909	13,892,896	9,296,969	108,914	23,298,779
1910	15,641,158	9,354,437	158,492	25,154,087
1911	15,027,459	7,890,753	111,267	23,029,479
1912 (6 mos.)	8,992,860	4,838,765	51,858	13,883,483

The total production of steel castings for the first six months of 1912 was 490,218 gross tons of which 448,846 gross tons were open-hearth, 29,541 gross tons Bessemer, and 11,831 gross tons of all other kinds of steel. A comparison with one half the previous year's production shows an increase of 166,904 gross tons of which 163,250 gross tons were open-hearth steel, 990 gross tons Bessemer steel and 2,664 gross tons all other kinds of steel.

Total Production of Castings.

	Open Hearth	Bessemer	All Other	Total
1907	746,525	33,273	23,319	803,117
1908	311,777	20,559	13,884	346,220
1909	601,040	33,814	21,388	656,242
1910	853,351	58,335	19,146	940,832
1911	571,191	57,101	18,335	646,627
1912 (6 mos.)	448,846	29,541	11,831	490,218

Analyzing the total production of open-hearth steel as given above according to the process used in manufacture, the total production of open-hearth ingots and castings for the first six months of 1912 was 9,441,706 gross tons of which 8,927,579 gross tons were made in basic-lined furnaces and 514,-

Total Production of Open Hearth Ingots and Castings.

	Basic	Acid	Total
1907	10,279,315	1,270,421	11,549,736
1908	7,140,425	696,304	7,836,729
1909	13,417,472	1,076,464	14,493,936
1910	15,292,329	1,212,180	16,504,509
1911	14,685,932	912,718	15,598,650
1912 (6 mos.)	8,927,579	514,127	9,441,706

127 gross tons in acid-lined furnaces. Compared with half the production in 1911 this shows an increase of 1,642,381 gross tons of open-hearth steel of which the increase of basic open-hearth was 1,584,613 gross tons and of acid open-hearth steel 57,768 gross tons.

Of the total production of open-hearth steel in the first six months of 1912, 8,992,860 gross tons were ingots and 448,846 gross tons, castings.

Of the total production of ingots, 8,689,144 gross tons were made by the basic process and 303,716 gross tons, by the acid process. Compared with one-half the production of 1911 the basic ingots show an increase of 1,479,491 tons while the acid ingots show a decrease of 360 tons.

Open Hearth Ingots.

	Basic	Acid	Total
1907	9,912,839	890,372	10,803,211
1908	6,985,420	539,532	7,524,952
1909	13,111,467	781,429	13,892,896
1910	14,858,353	782,805	15,641,158
1911	14,419,306	608,153	15,027,459
1912 (6 mos.)	8,689,144	303,716	8,992,860

Open Hearth Castings.

	Basic	Acid	Total
1907	366,476	380,049	746,525
1908	155,005	156,772	311,777
1909	305,005	295,035	601,040
1910	433,976	429,375	863,351
1911	266,626	304,565	571,191
1912 (6 mos.)	238,435	210,411	448,846

Of the total production of open-hearth steel castings in the first six months of 1912, namely 448,846 gross tons, 238,435 gross tons were basic and 210,411 gross tons were acid. In comparison with the first half of 1911 this shows a total increase of 163,251 gross tons of which 105,122 gross tons were basic and 58,129 gross tons were acid.

The total production of acid Bessemer steel ingots and castings in the first six months of 1912 was 4,868,306 gross tons of which 4,838,765 gross tons were ingots and 29,541 gross tons, castings. Both ingots and castings show an increase in rate of production over 1911. The total increase over one-half the production of 1911 was 894,379 gross tons of which 893,389 gross tons were increase in ingots and 990 gross tons increase in castings.

Bessemer Steel Production.

	Ingots	Castings	Total
1907	11,634,276	33,273	11,667,549
1908	6,096,196	20,559	6,116,755
1909	9,295,969	33,814	9,330,783
1910	9,354,437	58,335	9,412,772
1911	7,890,753	57,101	7,947,854
1912 (6 mos.)	4,838,765	29,541	4,868,306

Other Steel Ingots and Castings.

	Crucible	Electric	Miscellaneous	Total
1907	131,234	.....	14,075	145,309
1908	63,631	.....	6,132	69,763
1909	107,355	13,762	9,185	130,302
1910	122,303	52,141	3,194	177,638
1911	97,653	29,105	2,844	129,602
1912 (6 mos.)	53,476	6,882	3,331	63,689

Ingots.

	Crucible.	Electric.	Misc.	Total.
1907	121,001	.....	989	121,990
1908	55,360	.....	519	55,879
1909	94,672	13,456	786	108,914
1910	107,671	50,821	...	158,492
1911	83,623	27,227	417	111,267
1912 (6 months)	45,281	6,359	218	51,858

The total production of all other kinds of steel for the first six months of 1912 as given herewith, 63,689 gross tons, may be subdivided into 53,476 tons of crucible steel, 6,882 gross tons of electric or electrically refined steel and 3,331 gross tons of miscellaneous steel including cemented bars.

Of the total production of all other kinds of steel, 51,858 gross tons were ingots of which 45,281 gross tons were crucible ingots, 6,359 gross tons electric steel ingots and 218 gross tons miscellaneous ingots.

Of the total production of all other kinds of steel, 11,831 gross tons were steel castings of which 8,195 gross tons were crucible castings, 523 gross tons electric steel castings and 3,113 gross tons miscellaneous castings.

Rails

The total production of rails of all kinds for the first six months of 1912 was 1,466,565 gross tons. The total production for the calendar year 1911 was 2,822,790 gross tons and assuming an even distribution between the half years, the production of the first six months of 1911 may be estimated at 1,411,395 gross tons. On this basis the production of the first half of 1912 shows an increase of only 55,170 gross tons or 3.9 per cent over the corresponding period of the previous year. Of the total production for the first half of 1912, 496,927 gross tons were of Bessemer steel, 926,504 of open-hearth steel and 43,134 were rerolled from old rails or made from electric steel. As compared with one-half of the production of 1911, this shows a decrease in the production of Bessemer steel rails of 29,783 gross tons or over 5.6 per cent, and an increase in that of open-hearth steel rails of 88,042 gross tons or over 10.4 per cent. The production of rails for the five years 1907-1911 is given in the accompanying table. In 1911 the system of classification was changed so that the figures for that year are not strictly comparable with preceding years. This change accounts for the increase under the head of "all other rails." For the years 1907-1910, inclusive, the figures given under this head represent the production of iron rails only. In 1911 the total of 92,447 gross tons includes 234 gross tons of iron rails, 462 gross tons of electric steel rails and 91,751 gross tons of rerolled rails which could not be classified by manufacturers. In previous years these rails

had been added to the Bessemer and open-hearth production, the larger part being classed as Bessemer. In the first half of 1912 the tonnage of all other rails was 43,134 gross tons, of which 142 tons were electric steel rails and 42,992 gross tons were rerolled rails. No iron rails were reported.

Classification of the rail production by weight per yard shows that of the total production of rails in the first six months of 1912, namely, 1,466,565 gross tons, 123,684 gross tons weighed less than 45 pounds per yard, 511,523 gross tons weighed 45 pounds but less than 85 pounds and 831,358 gross tons weighed 85 pounds or over. Compared with one-half the production of 1911 this shows an increase of 14,305 gross tons in rails less than 45 pounds; a decrease of 22,325 gross tons in rails of 45 to 85 pounds; and an increase of 63,190 gross tons in rails over 85 pounds in weight.

The production of all kinds of rails for the first six months of 1912 is shown by weight and kinds in the accompanying table. Bessemer steel prevails in the lighter weights, whereas in the heavy sections of 85 pounds and over the open-hearth constitutes 79 per cent of the production.

Finished Rolled Products

The accompanying table A gives the production of finished rolled iron and steel for the first six months of 1912 showing separately the production of rolled iron and rolled steel as well as the total tonnage for 15 classes of product. The classification used by the American Iron and Steel Association has been followed in compiling the results so that they are comparable with figures for previous years. Semi-finished rolled products intended for further rolling, such as blooms, billets, slabs, sheet and tin bars, have not been included. Plates include production rolled to No. 12 gage or thicker, and sheets, production rolled to No. 13 gage or thinner. The production of black plate for tinning and of tie plates included in the body of the table under sheets and plates are separately stated at the foot of the table.

Comparison with the production of 1911 is not possible, except in the case of rails, structural shapes and wire rods, for the reason that data for other products have not yet been published. The accompanying table B gives the production of finished rolled products for the years 1909 and 1910 to which has been added the production for the first six months of 1912. An extensive study of the statistics of rolled iron and steel products is in preparation and will be published in connection with the final report. For comparison with the results

Castings.

	Crucible.	Electric.	Misc.	Total.
1907	10,233	.....	13,086	23,319
1908	8,271	.....	5,613	13,884
1909	12,683	306	8,399	21,388
1910	14,632	1,320	3,194	19,146
1911	14,030	1,878	2,427	18,335
1912 (6 months)	8,195	523	3,113	11,831

Production of Rails, 1907-1912.

Year.	Bessemer rails.	Open-hearth rails.	All other rails.	Total.
1907	3,380,025	252,704	925	3,633,654
1908	1,349,153	571,791	71	1,921,015
1909	1,767,171	1,256,674	.....	3,023,845
1910	1,884,442	1,751,359	230	3,636,031
1911	1,053,420	1,676,923	92,447	2,822,790
1912 (six months)	496,927	926,504	43,134	1,466,565

Production of Rails by Weight.

Year.	Under 45 lbs.	45 lbs. and less than 85.	85 pounds and over.	Total.
1907	295,838	1,569,985	1,767,831	3,633,654
1908	183,869	687,632	1,049,514	1,921,015
1909	255,726	1,024,856	1,743,263	3,023,845
1910	260,709	1,275,339	2,099,983	3,636,031
1911	218,758	1,067,696	1,536,336	2,822,790
1912 (six months)	123,684	511,523	831,358	1,466,565

Kind.	Under 45 lbs.	45 lbs. and under 85 lbs.	85 lbs. and over.	Total.
Bessemer	52,142	272,029	172,756	496,927
Open-hearth	29,559	238,388	658,557	926,504
Electric	10	87	45	142
Rerolled	41,973	1,019	.....	42,992
Total	123,684	511,523	831,358	1,466,565

Table A.

PRODUCTION OF FINISHED IRON AND STEEL ROLLED PRODUCTS. FIRST SIX MONTHS, 1912.—GROSS TONS.

Finished Rolled Products—Gross Tons.	Iron, gross tons.	Steel, gross tons.	Total, gross tons.
Plates and sheets:—			
Plates—No. 12 gage and thicker	30,917	1,567,310	1,598,227
Sheets—No. 13 gage and thinner	26,397	1,300,137	1,326,534
Total, plates and sheets	57,314	2,867,447	2,924,761
Rails	.....	1,466,565	1,466,565
Nail plate	6,930	18,045	24,975
Structural shapes	.....	1,223,886	1,223,886
Wire rods	.....	1,220,004	1,220,004
Merchant bars	426,191	1,424,212	1,850,403
Bars for reinforced concrete	2,169	118,813	120,982
Skelp	141,355	989,063	1,130,418
Splice Bars	14,761	92,020	106,781
Hoops	.....	130,345	130,345
Bands and cotton ties	12	204,322	204,334
Rolled forging blooms or billets	1,066	187,771	188,837
Other Finished rolled products	129,683	479,845	609,528
Total finished rolled products	779,481	10,422,338	11,201,819
Black plates for tinning included in plates and sheets above	1,057	498,294	499,351
Tie plates included in plates and sheets above	24,446	70,690	95,136

set forth in the table below it may be stated that the production for the year 1911 of the three products at present available was: Rails, 2,822,790 gross tons; structural shapes, 1,912,367 gross tons, and wire rods, 2,450,453 gross tons.

Table B.

PRODUCTION OF FINISHED ROLLED PRODUCTS.

	1909.	1910.	1912. (6 mos.)
Plates	2,379,098	2,807,728	1,598,227
Sheets	1,855,248	2,147,756	1,326,534
Total plates and sheets	4,234,346	4,955,484	2,924,761
Nail plates	63,746	45,294	24,975
Rails	3,023,845	3,636,031	1,466,565
Structural shapes	2,275,562	2,266,890	1,223,886
Wire rods	2,335,685	2,241,830	1,220,004
Merchant bars	3,263,531	3,785,731	1,850,403
Concrete bars	159,352	241,109	120,982
Skelp	2,633,381	1,828,194	1,130,418
Splice bars	230,283	223,022	106,781
Hoops	250,179	262,214	130,345
Bands and cotton ties	395,333	424,979	204,334
Rolled forging blooms	341,773	459,933	188,837
Other finished rolled products	1,067,674	1,250,568	609,528
Total finished rolled products	19,644,690	21,621,279	11,201,819

EMPLOYES GRANTED

Bonus of Five Per Cent by Youngstown Sheet & Tube Co.

Directors of the Youngstown Sheet & Tube Co., Youngstown, O., have voted to grant their employes, numbering almost 8,000, a profit-sharing bonus of 5 per cent of their wages received during the year ended June 30, last. A total of almost $125,000 will be distributed to the employes in all departments, except the executive offices. All employes who were working for the company on June 30 of this year, or who were away on account of illness at that time, will participate in the profits. This was the basis during the preceding two years, which with the past year represent the period during which the plan has been in effect. President James A. Campbell said that while the profits during the past year hardly justified it, the directors were of the opinion that 5 per cent should be the minimum basis of division of profits with the employes. If business improves in the future the amount of the bonus may be increased. The bonuses will be paid out as soon as the clerical work required to find out how much each person is entitled to is completed.

Visit Rolling Mill Works

The Master Sheet Metal Workers' Association, of Cincinnati, Covington, Newport and its vicinity, visited the plant of The American Rolling Mill Co., Middletown, O., last week. Approximately 125 persons were in the party, brought by special train over the C., L. & N. from Cincinnati direct to the new East Side plant of this company.

After an address of welcome at the entrance of the plant, by G. M. Verity, president of the company, the party was divided into groups, each group being given a guide and shown over every part of the mill as well as the process of manufacture of American ingot iron. Not the least interesting part of this visit was that made by the party to the research laboratory. This laboratory is one of the most modern and best equipped in the United States.

Urge Acceptance of New Compensation Law

The new Michigan workmen's compensation law went into effect Sept. 1. The Employers' Association of Detroit, probably the most influential body of employers in the state, has issued a digest of the law as compiled by its legal and legislative committee. The committee points out that heretofore existing legal defenses to accident suits have been swept away, and that employers would do well to come under the new law, saying:

"In view of the express removal of the defenses heretofore allowed in personal injury cases, it seems imperative that all members of the Association expressly elect to be governed by filing with the industrial accident board, an acceptance.

"It is deemed necessary that the members of the association not only elect, as indicated, their acceptance of the act, but also to safeguard their interests insist that all employes also accept the provisions of the law."

Export Association.—The third annual meeting and banquet of the American Manufacturers' Export Association will be held at the Hotel Astor, New York City, Sept. 20 and 21.

FARRELL AT FARRELL

Gives an Optimistic Talk—Importance of Export Trade.

James A. Farrell, president of the United States Steel Corporation, in company with several officers of subsidiary companies, visited and inspected Corporation properties at Farrell, Pa., Aug. 29. Works were visited in the morning and at noon a lunch was given members of the party. In the evening a banquet was tendered Mr. Farrell. Following the luncheon, President Farrell said:

"The prospects before the iron and steel industry today are brighter than at any time during the past two years. Business conditions are improving and confidence, the leaven of trade, is returning. The outlook for the major crops is for bountiful harvests. The railroads are placing orders for rolling stock and equipment and sentiment in financial circles is in support of increased commercial and manufacturing development.

"Our export trade is increasing and much of the product of the mills in this vicinity finds its way abroad, but this business is one which must be consistently developed and which requires patient application, since it must not be forgotten that all of Europe is our competitor in the markets of the world and, with its governmental support, its large aggregation of capital and its integrated industries, it has built up an enormous foreign trade, which makes it a formidable competitor."

Included in the party were: Alva C. Dinkey, president of the Carnegie Steel Co.; John Rice, vice president of the Carnegie company; C. L. Miller, vice president of the American Steel & Wire Co.; S. A. Davis, vice president of the American Sheet & Tin Plate Co., and John Oursler, superintendent of the Sharon and Newcastle districts.

Gives Customers Warning

Notices have been sent out from its Chicago offices by the American Steel & Wire Co. to all of its customers urging them to anticipate their winter requirements as far as possible now, as they may expect to encounter great delay in deliveries later in the year that will come as a result of an inevitable shortage of cars on railroads of the country.

Lake Superior Mining Institute Meets at Houghton

Valuable Papers Read—Copper Mines Visited—Dr. Holmes Says He is Not Helping in Trust Busting

For the scene of its 17th annual meeting, marking the 20th year in its history, the Lake Superior Mining Institute selected the beautiful country surrounding the copper mines in the vicinity of Houghton, Mich. The convention opened Wednesday, Aug. 28, and closed Friday, Aug. 30, headquarters being maintained at the Douglass House, Houghton. An unusually complete souvenir handbook containing maps, tables, historical information and a quantity of valuable data was compiled for the occasion by Arthur L. Carnahan. The reception, transportation and entertainment of the members were handled by three committees headed, respectively, by F. J. Bawden, Jas. B. Cooper and James R. Dee, who provided everything that could be expected for the comfort and welfare of the party in visiting the various copper mines. The meeting was one of the largest in the history of the institute, 257 members and guests being registered.

The program opened Wednesday afternoon, when a special train left Houghton for an excursion to points of interest on the southwestern end of the copper range. Considerable time was spent at the copper smelting plant of the Michigan Smelting Co., at Coles Creek and at the mines of the Copper Range Consolidated Co. near Painesdale.

The first professional session of the convention was held in the banquet hall of the new Masonic building at Houghton, on Wednesday evening. F. W. Denton, president of the institute, opened the proceedings with a few brief remarks, outlining recent developments on the copper ranges. Several interesting papers were presented, including a number bearing on iron ore mining.

The first of these was by Wm. Conibear, and dealt with the universal problem of accident prevention and described the details of the system of safety inspection adopted by the Cleveland-Cliffs Iron Co. in its mines on the Marquette range and elsewhere. This paper will be published in full in a later issue of The Iron Trade Review.

A paper on "Methods of Sampling at Lake Superior Iron Mines", by Benedict Crowell, of Cleveland, was read by title in the absence of the author.

E. N. Cody, of Negaunee, Mich., presented an interesting paper on "Raising the Shaft at the Rolling Mill Mine of the Jones & Laughlin Steel Co."

E. B. Wilson, of Scranton, Pa., read a paper on "Mine Sanitation", which discussed the various diseases to which miners are subject and their prevention by proper sanitary measures. A design for a model change house or dry was included in the paper.

A paper on "Economical Lubrication" was read by W. W. Davis, of Boston, and will be published in a later issue of The Iron Trade Review.

Visiting Copper Mines

Thursday was spent visiting the copper mines north of Houghton and Hancock, a special train being provided for the party. The mines and mills of the Calumet & Hecla Co. were first visited, after which the party inspected the Ahmeek mine. Luncheon was served at Electric Park, and in the afternoon the Franklin Jr. copper mine was visited. This mine is equipped with an air-balanced hoist of new type, the details of which will be described in a subsequent issue of The Iron Trade Review.

On Thursday evening, the institute was delightfully entertained at dinner at the Onigaming Yacht Club. The diners were treated during and after the meal to several excellent musical numbers by the famous Calumet & Hecla band. At this gathering, a few informal remarks were made to the members of the institute by Dr. Joseph A. Holmes, director of the United States Bureau of Mines. He outlined the work the bureau is doing in the prevention of mining wastes and the reduction of mining accidents and emphasized the point that the bureau is not connected with any of the trust investigating activities of the government. Discussions of the practical application of the recommendations of the bureau of mines for the safety of men were interestingly presented by E. M. Gow and M. M. Duncan.

The second professional session was held Friday morning at the gymnasium of the Michigan College of Mines. A paper describing "Raising, Sinking and Concreting No. 3 Shaft, Negaunee Mine", was read by title by the author, S. R. Elliott, of Negaunee, Mich.

O. P. Hood presented a paper on "Balancing Rock Crushers", in which he described a graphical method of analyzing the action of jaw crushers and of providing for the unbalanced forces by a counterweight placed in the flywheel.

H. T. Mercer, of Painesdale, Mich., read an interesting paper entitled "Some Applications of Concrete Underground", in which he described some concrete mine timbering done at very low cost.

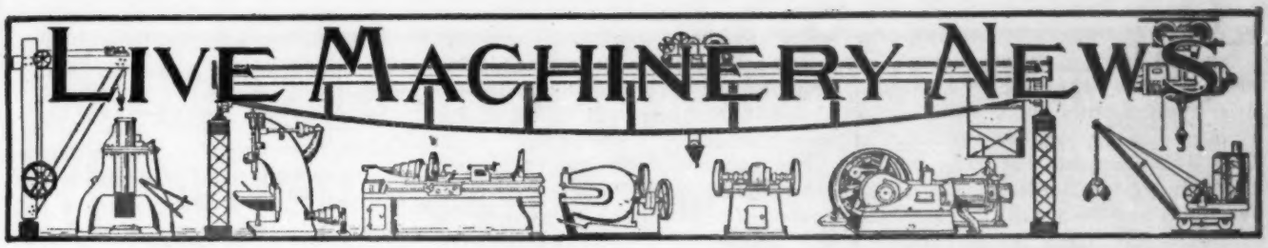
In addition to the papers referred to specifically above, a large number bearing directly on the copper mining industry, were also presented. The convention closed with a brief business session, in which the formal reports of the various officers and committees were read. The secretary's report showed that there are now 486 members in the institute and that 27 new members were admitted during the past year. The treasurer's report indicated further substantial financial progress. Hereafter the special committees of the Institute, on Accident Prevention, Care in Handling Hoisting Ropes, Bureau of Mines, etc., will have funds at their disposal for the prosecution of their work.

A resolution of sympathy on the death of Graham Pope, past president and last year manager of the institute, was presented and approved.

Election of Officers

For the ensuing year, the following officers were unanimously elected: President, Pentecost Mitchell, of Duluth, vice president of the Oliver Iron Mining Co.; treasurer, E. W. Hopkins, of Commonwealth, Wis., and secretary, A. T. Yungbluth, of Ishpeming, who has held this post efficiently for many years. For a term of two years, F. J. Webb, of Duluth, and A. D. Edwards, Atlantic Mine, Mich., were elected vice presidents, and W. P. Chinn was elected to fill a vice presidential vacancy for one year. The following managers were elected for a term of three years: G. S. Barber, of Bessemer; W. H. Johnston, of Ishpeming, and C. H. Baxter, of Loretto, Mich.

After the election of officers an inspection of the several buildings of the Michigan College of Mines was made, where various demonstrations of the work of the college were in progress. The meeting next year will be held on the Minnesota iron ranges.



In New York, two new lists of machine tool specifications have been sent out to the trade. The largest was issued by the New York, New Haven & Hartford railroad and this calls for 80 tools of various kinds, 65 of which are to be installed in the addition to the shops at Readville, Mass. The list calls for machines valued at about $80,000. The second list was distributed by the General Electric Co. and contains specifications for 17 machines, which have a value of approximately $10,000. These tools are to be installed in the shops at Schenectady, N. Y. The General Electric Co. has also been a purchaser in this market this week, closing for some machinery which was specified in the list sent out in June. The Baron de Hirsch Trade School list, contrary to expectations, is still pending. The De La Vergne Machine Co. has closed for about 25 per cent of the list submitted a few weeks ago. The list issued by the Virginian railroad a few weeks ago has been closed, the awards being divided among six or seven houses. Because of the fact that machinery manufacturers are well supplied with orders, dealers state that present business is being taken, as a rule, without any price concession. August was a good month in the New York market and the business booked is thought to have been considerably larger in volume than that entered in July. New York sales agents for crane manufacturers report a large volume of sales, especially in the middle west. Export houses report a good demand from abroad and state that business is very active in all the countries of Europe with the exception of Italy. Germany and England have been especially good markets for American machinery of late.

In Pittsburgh, machine tool dealers report that August has been one of the most satisfactory months enjoyed this year. Inquiries for all lines of equipment have been heavy and some good contracts have been placed in this territory. Orders have been well distributed and a general feeling of optimism prevails in all branches of the trade. Repairs and extensions to mills have caused a heavy demand for additional machinery and several inquiries for rather extensive equipment are still pending.

In Cleveland, machine tool dealers experienced one of the best months in years during August, the amount of business transacted being unusually large. Last month showed a gain over July, despite the marked increase of business during that month. The orders for the huge list sent out by the Pennsylvania lines for its northwestern system have not been placed. Inquiries are holding up well, although no large lists have been received in this district during the past week. Railroad inquiries continue heavy and there is a general feeling of satisfaction among dealers over the improved conditions.

In Cincinnati, several manufacturers of machinery and machine tools report that they are doing better business than at any time in the history of their organizations. Business has improved again after a slight lull last week, and new orders and specifications are coming in in fair lots. The railroads continue to place orders for machine tools, usually for only a few at a time, but the total number recently placed with all of the local plants, will make a good volume. Electrical machinery is selling better than at any time in years, and local plants are well supplied with orders. Lathes appear to still be the best sellers among the machine tool makers, although practically all machine tools are in demand. Second hand machinery, however, does not keep pace with new machinery, and business along this line is not as good as expected.

Machine Tools

The New York, New Haven & Hartford railroad has issued a list of specifications for 80 machine tools and other equipment, mailing it from the New Haven offices on Aug. 28. Bids are to be in by Sept. 6. The list is in two parts, prices on 65 tools to be quoted f. o. b. Harlem River, New York. The other 15 tools are to go to the shops at Readville, Mass., where an addition is to be erected. The contract for the construction of the latter has just been awarded to the Burlington Construction Co. The list, which involves an outlay of about $80,000, is as follows:

One 2½-inch heading and forging machine.
One plain power press.
One buffing lathe.
One double surfacer.
One 20-inch jointer.
One mortiser and borer.
One 42-inch band saw.
One combination saw bench.
One reversible shaper.
One thru-spindle borer.
One coil winding machine.
One 6-foot squaring shears.
One 260-ton Sellers armature press.
Two Ferguson oil furnaces.
One duplex milling machine.
One vertical milling machine.
One universal milling machine.
One 2-foot sensitive radial drill.
Three 2-foot plain radial drills.
Two 2½-foot plain radial drills.
One 6-foot universal radial drill.
Two 24-inch water tool grinders.
One universal water tool grinder.
One wet drill grinder.
One floor grinder.
One automatic knife grinder.
One 48-inch grindstone frame.
One cold saw cutting-off machine.
One power hack saw.
One 36-inch metal band saw.
One 3-inch pipe cutter.
One 2-inch double bolt cutter.
One 36-inch punch and shear.
One 75-pound power hammer.
One 1,200-pound steam hammer.
One 90-inch wheel lathe.
One 42-inch wheel lathe.
One 100-inch wheel press.
One double axle lathe.
One 24-inch vertical turret lathe.
One 52-inch boring mill.
One 84-inch boring mill.
Two 14-inch engine lathes.
One 16-inch tool room lathe.
One 18-inch engine lathe.
One 36-inch engine lathe.
One 42-inch engine lathe.
One 48-inch engine lathe.
One 60-inch engine lathe.
One 2½ x 26-inch turret lathe.
One 24-inch patternmaker's lathe.
Two 40-inch banding machines.
One 22 x 22-inch x 5-foot planer.
One 36 x 36-inch x 12-foot planer.
One 24-inch crank shaper.
One 24-inch universal crank shaper.
One 15-inch slotting machine.
One 1½-inch quadruple bolt cutter, belt driven.
One brake and folder.
One 6-foot squaring shears, foot power.
One 2,000-cubic foot air compressor.
Two flue furnaces.
Two cranes, each with one 40-ton trolley and one auxiliary hoist of 10 tons.
One 16-foot flanging clamp, air operated.
One 60-inch throat, single punch, motor driven.
One 16-foot plate bending rolls, motor driven.
One 6-foot plate bending rolls, motor driven.
One flue welding machine, belt driven.
One flue cleaning machine, motor driven.
One 3-inch pipe cutter and threader, motor driven.

The General Electric Co., Schenectady, N. Y., issued a list of machine tool specifications on Aug. 30. The tools are 17 in number and are to

be delivered at the Schenectady plant. They will involve an expenditure of about $10,000. They are to be motor driven, the motors and controllers to be furnished by the General Electric Co. This company has also, during the past week, placed an order for a few tools on the list of 23 machines issued in June. The list just put out to the trade is as follows:

One vertical milling machine.
One No. 3 plain miller.
One 14-inch x 6-foot engine lathe.
One geared punch press.
Two power, inclinable, punch presses.
One double action press.
One 14 x 96-inch plain grinder.
One 11 x 48-inch speed lathe.
One 24-inch shaper.
One 36-inch x 10-foot planer.
One 48-inch x 16-foot planer.
One automatic screw machine.
Two No. 1 hand screw machines.
Two No. 2 hand screw machines.

The Decatur Cornice & Roofing Co., Inc., New Decatur, Ala., advises that, in equipping its new wrought iron shop, it will require the following: One combined double-end power punch and shear with a capacity to shear ¾ x 6-inch bars, 4 x 4-inch angles, and to punch a 1-inch hole in 1-inch metal; one combined rod and pipe threading machine, capacity 1½-inch rods and 2½-inch pipe; one drill press, capacity 1½ inches; one bar bending machine, capacity ⅝ x 3 inches; one power hack saw with 24-inch blade. The company will purchase second hand machines if they are in good condition.

New Construction

The Wheeling Mold & Foundry Co., Wheeling, W. Va., is erecting two large water tanks at its plant near Wheeling. Other improvements are contemplated.

The Quigley Foundry & Machine Co. has awarded the contract to the McClintic-Marshall Construction Co., Pittsburgh, Pa., for the erection of a new plant at Chicopee Falls, Mass.

The Ferro Machine & Foundry Co., Cleveland, is erecting a manufacturing building, about 118 x 238 feet, three stories, and basement, of reinforced concrete construction, at 6600 Euclid avenue.

Work on the additions to the plant of the Pennsylvania Tank Car Co., Sharon, Pa., has begun. The additions will consist of a forge shop, 50 x 60 feet, an addition of 125 feet to the main building, and a fabricating shop, 50 x 125 feet.

The Pioneer Tractor Mfg. Co., Winona, Minn., is building a plant at Calgary, Alberta, Can., which will include a machine shop and foundry of brick and steel construction. The machine shop will be 100 x 600 feet and the foundry, 100 x 80 feet. An office building also will be built which will be 100 x 80 feet. Shipping facilities are provided by both the Canadian Northern and Canadian Pacific railroads.

The Standard Brass Works is making progress on its new plant now in course of construction in Detroit. It will consist of a two-story building, 55 x 117 feet, of mill construction; foundry, 52 x 100 feet, with trussed roof; boiler and engine house, 25 x 35 feet and shed 15 x 60 feet for storage of sand, coal and coke. The unusually large brass foundry will enable the company to largely increase its business of casting automobile parts and other brass goods.

The Vulcan Iron Works, Wilkes-Barre, Pa., has begun the manufacture of machinery for making sugar and is erecting a plant known as the Hamilton mill. It consists of one 34 x 72-inch mill, driven by a 32 x 60-inch simple Corliss engine, and one single three-roll mill, driven by a 22 x 48-inch simple Corliss engine and one 30 x 72-inch cane crusher, driven by an 18 x 30-inch simple slide valve engine. At present the Vulcan Iron Works is working night and day completing a large contract of machinery for the Senado Sugar Co., Senado, Cuba.

Miscellaneous

Equipment in the building formerly occupied by the Stoever Foundry & Mfg. Co., Myerstown, Pa., has been shipped to the plant of the Treadwell Engineering Co., Easton, Pa.

The Henry Vogt Machine Co., of Louisville, has enlarged its power plant, installing a 300-kilowatt generator direct connected to a Corliss engine. The generator has a capacity of 250 volts, and was furnished by the James Clark Jr. Electric Co., of Louisville.

The Meadow Mill plant of the American Sheet & Tin Plate Co., at Scottdale, Pa., which closed down June 1, for repairs, is expected to resume operations shortly. General repairs have been made and a new engine installed in the plant.

The Superior Development Association, Superior, Wis., has engaged J. O. Bach, architect, to prepare plans for a $100,000 auditorium building, to be of steel and brick construction, with a steel truss roof. It will be 100 x 140 feet in size. W. H. Webb is president.

The Keystone Tube Works, Connellsville, Pa., which recently went into the hands of a receiver, is now operating on a double shift, and it is believed the plant will be soundly established financially in several months. W. A. Stone, who was appointed to take charge of the works last March, was named receiver.

Shops of the Pennsylvania Railroad Co., at Newcastle, Pa., are working at full capacity for the first time in several years. According to reports, railroad shops in all parts of the country are being operated at maximum capacity. It is announced that the Lake Shore railroad will increase its repair shops at Ashtabula, O., in the immediate future.

The Champion Horseshoe Works, Pawtucket, R. I., has started operations in the building formerly occupied by the Pawtucket Foundry Co. The plant when in full operation, will employ 90 hands and will be operated by electricity in all departments with the exception of the rolling room, where steam power will be used. The first day's production was between 300 and 350 kegs of horseshoes.

The J. D. Smith Foundry Supply Co., Cleveland, is installing a large battery of core ovens in the plant of the Interstate Foundry Co., of that city. In addition, an installation of a battery of ovens is being made at the plant of the Lycoming Foundry & Machine Co., Williamsport, Pa., and a trolley system is being added to the equipment of the plant of the American Car & Ship Hardware Mfg. Co., New Castle, Pa.

The Intercity Power Co., New York City, is the title of a company just incorporated in Delaware with $10,000,000 capital. The incorporators include Harry M. Duerning and Louis F. Mintz, New York City, and James W. Deevy, Brooklyn, N. Y. It is believed that the Intercity Power Co. is the one under which the old Long Acre Light & Power Co. is to take new form and carry on active operations in New York. The plans of the latter, announced two months ago, included the erection of a power plant on the Jersey meadows outside of Jersey City.

The J. & J. B. Millholland Co., Pittsburgh, has signed contracts for furnishing machinery and valves for the new lock at St. Marys Falls, Sault Ste. Marie, Mich. The contract includes all machinery for operating gates, necessary filling valves, sluice valves, four capstans, electrically driven, eight operating machines, electrically driven, and 12 air engines for operating filling valves. The company also has received a contract for steel castings for mitering lock gates on the Mississippi river and sluice gates for locks on the Cumberland river, Tennessee. The approximate amount of the contracts is $150,000.

New Buyers

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

Hercules Car Mover Co., Appleton, Wis.; $5,000; by Gus H. Buchert, Emma Buchert, Arthur Bishop.

Medina Machine Co., Medina, O.; $25,000; by F. W. Woods, F. M. Branch, C. R. Warner, O. V. Neumeyer, W. I. Kennedy.

Perfection Mortise Machine Co., Columbus, O.; $15,000; by S. A. Webb, H. E. Stafford, W. J. Booth, Cyrus Huling, Frank C. Huling.

Pipe Machinery Co., Cleveland; $10,000; by Walter C. Crossner, William G. Benningsoff, A. A. Clay, E. M. Bain, H. C. Boyd.

Parks-Trenary-Houchin Foundry Co., Atlanta, Ga.; $6,000; by A. C. Parks, W. F. Trenary, J. R. Houchin and others.

Southern Tool & Supply Co., Chattanooga; $25,000; by J. W. Gore, Kelly O'Rear, W. P. Moore and others.

U. T. Hungerford Brass & Copper Co., Boston and New York; $5,000; by Judson J. Whitehead, Frank P. Estabrook and Raymond T. Sewall.

General Engineering & Mfg. Co., Lynn, Mass.; $30,000; by Jesse Coates, Matthew M. Merritt and William E. De Wolfe.

Universal Gage Co., Ltd., Boston; $25,000; by John MacGregor, Murray Winter, Harry B. Eaton, Lucius F. Arnold and John H. Marsh.

North Adams Machine Brush Co.; $7,500, by Thomas Hewat, J. Andrew Cleghorn and Fred C. Severange.

Premier Aluminum Foundry Co., Cleveland; $10,000; by Edward L. Frentz, C. C. Frentz, J. C. Hutchins, F. L. Stevens, C. J. Neal.

National Stoker Co., Indianapolis; manufacturers, $10,000; by directors, L. I. Snodgrass, J. C. McCrea, M. H. Miller.

Wern Machinery & Engineering Co., Manhattan, New York City; $50,000; contracting, etc.; by Gust Pers Wern, Algot E. Sylvan, Wandla C. Wern, all of 96 Hamilton place, New York City.

Brockway Motor Truck Co., Cortland, N. Y.; $100,000; to manufacture motor vehicles, etc.; by Geo. A. Brockway, Chas. S. Pomeroy, Fredk. R. Thompson, all of Homer, N. Y.

Keiths, Ltd., Toronto; $150,000; to carry on an engineering and general contracting business; by provisional directors, David F. Keith, George A. Keith and Wm. W. Davidson.

The Regal Fence Co., Ltd., Sarnia, Ont.; $100,000; to manufacture wire fences; by provisional directors, Arthur J. Chester, Charles Simmons, Melvin Simmons and others.

National Bookkeeping Machines, Ltd., Toronto; $250,000; by provisional directors, Thos. J. Sproule, David Lowrey, William R. Willard and others.

Pioneer Motor Car Co., Troy, N. Y.; $10,000; automobiles; by Henry Richardson, Northrup R. Holmes, both of Troy, and Geo. N. Nay, Hudson Falls, N. Y.

Steel Specialties Co., Boston; capital stock, $50,000; directors, E. P. Worth, president; George L. Richards, Malden, treasurer, and J. W. Morton.

Radial Buffer Co., Manhattan, New York City; $12,000; machinery; by Saul S. Allen, 30 Church street, Frank R. Sedles, William Hollinger, both of 46 Cedar street, New York City.

McCabe & Steen Track Laying Machine Co., Kansas City; $50,000; to manufacture, sell and rent track-laying machinery; by Samuel E. Sexton, George Hucke, Frank W. McCabe and Vernon E. Steen.

Pennsylvania Appliance Co., Camden, N. J.; $5,000; to manufacture electrical and mechanical appliances; by George H. B. Martin, C. U. Martin and John A. MacPeak, all of 419 Market street, Camden.

The Cukor Safety Crank Co., Manhattan, New York City; $40,000; automobiles; by Bela Cukor, 65 St. Andrews place, Yonkers; Isadore Eustaedter, 71 Seventh street, Hyman J. Rosenbaum, 215 Bay Fifteenth street, Brooklyn.

Dominion Roofing Mfg. Co., Ltd., Toronto; $60,000; to manufacture roofing and all kinds of builders' and contractors' supplies; by provisional directors, Earl R. Maltby, Ninian R. Lindsay and Henry Hunter.

Andrews Mfg. Co., Dayton, O., $100,000; refrigerators and refrigerating machinery; by W. C. Speaker, Frank W. Andrews, Frank Monroe, Frederick D. Strickler and Edwin H. Stouder.

Strebel Automatic Machinery Co., Bergenfield, N. J.; $100,000; to manufacture machinery; by Louis Strebel, Augusta Strebel, both of 71 Prospect street, Bergenfield; Alexander Macleod, 211 East 237th street, New York City.

Motorgraph Co. of America, St. Louis; $2,000; to manufacture moving picture machines and appliances and to make films of animated objects and reproduce same; by Geo. W. Helmrich, Albert Kochs, Frank X. Hiemenz.

Montauk Wire & Thermostat Co., Manhattan, New York City; $55,000; to manufacture fire prevention apparatus; by Edmund Keese, 1026 Delamere place; Marion Garrison, 2006 Caton avenue, Brooklyn; Henry Washburn, 32 Warren street, New York.

General Industrial

The German American Car Co., Chicago, has increased its capital stock from $500,000 to $700,000.

The Union Brass Works, Detroit, has increased its capital stock from $31,000 to $70,000.

The Iron City Foundry Co., Lebanon, Pa., which makes a specialty of manufacturing sashweights, has moved into its new plant.

The Muskegon Aluminum Foundry Co., Muskegon, Mich., has been incorporated with a capital stock of $10,000.

E. C. Gowan, city engineer, Wausau, Wis., is preparing plans and specifications for the reconstruction and new construction of bridges destroyed by the recent floods of the Wisconsin river.

The Manchester Machinery Co., Manchester, Ia., has been incorporated with a capitalization of $25,000 and will manufacture and repair machinery.

The Hill Pump Valve Co., Menasha, Wis., has filed articles of dissolution as a Wisconsin corporation. W. M.

Gilbert was president and T. M. Gilbert acted as secretary.

The American Foundry & Construction Co., Pittsburgh, advises that the recent fire which was communicated to its plant from an adjoining building, caused a loss which will not exceed $500, the company's plant being fireproof and preventing a greater damage.

The Lakeside Sanitarium Co., Oshkosh, Wis., is having plans prepared by William Waters, architect, for a $50,000 hospital building of brick and steel construction, to be erected at Washington and Hazel streets. Dr. M. E. Corbett is president and treasurer.

The Consolidated Motors, Ltd., Toronto, Can., automobile engineers, announce their incorporation and absorption of the business lately carried on by the Schacht Motor Car Co. of Canada, Ltd., at 112-116 Richmond street, west, Toronto.

The New Process Stove Co. division of the American Stove Co. has awarded a contract to the Hunkin-Conkey Construction Co., Cleveland, for the erection of three buildings on Perkins avenue, Cleveland. The buildings will range in height from one to three stories.

Joseph E. and August J. Hoffweber, La Crosse, Wis., have organized the Hoff Motor Car Co., authorized capital $500,000, for the purpose of manufacturing automobiles and motor vehicles. The promoters are attempting to interest outside capital in the venture and are at present negotiating at Tomah, Wis.

The Dominion Stamping Co. has erected a large forge shop at Walkerville, Ont., and closed contracts with a number of automobile manufacturers covering their requirements for 1913. It is also putting up a four-story building for its sheet metal business.

The Turner & Seymour Mfg. Co., Torrington, Conn., has just completed two additions to its plant. One will be used as a core room, and is 52 x 58 feet, one-story high, and of brick construction. The other, 40 x 64 feet, three stories high, will be used for a general manufacturing and shipping room.

The citizens of Pembroke, Ont., have adopted a by-law granting to the Canadian Northern Ontario railway a bonus of $25,000 and exemption from local taxation, with free water for 20 years, the company agreeing to make the town a divisional point on its transcontinental line and to erect shops there.

The John Knapp & Sons Foundry Co., Akron, O., advises that it has erected a foundry of brick and structural steel construction, 60 x 80 feet, with a daily output of eight tons of gray iron castings. A 5-ton hand power traveling crane operates the length of the building, while an elevator, fan, mill, and grinder are operated by electric motor. There are four sons in the company. They are: John Knapp Jr., C. J. Knapp, Frank Knapp and Anthony Knapp, all of whom are molders.

The General Vehicle Co. has prepared plans for the erection of a 6-story factory, 75 x 327 feet, on Starr avenue and Beaver street, Long Island City, N. Y., to cost $400,000. Two six-story wings will be added subsequently. The company will manufacture motor trucks at the new plant.

The Hare Engineering Co., which has secured a site of five acres in Galt, Ont., for its buildings, has succeeded in having its stock to the amount of $400,000 underwritten in England and will proceed at once with the erection of its plant, which will cost at least $150,000. The company will manufacture power equipment and pulp machinery.

Stockholders of the Duplex Metals Co., Chester, Pa., manufacturer of copper-clad steel wire, will hold a meeting Sept. 10, to pass upon a resolution to increase the preferred stock of the company by $1,500,000. The present stock is $500,000 preferred and $3,000,000 common. With the issuance of the new stock there will be $2,000,000 preferred and $3,000,000 common.

The Forbes Brass Co. Rochester, N. Y., manufacturer of plumbers' brass goods, has purchased the plant of the Sterling Brass Works, at Rochester, and is now operating this foundry. A new plant is being built in the Brighton section of Rochester, the buildings being of concrete construction. The foundry will be equipped with Tabor molding machines and Ideal melting furnaces. All of the equipment will be driven by individual motors.

The McCance Bros. Co., Inc., Pittsburgh, maker of all lines of galvanized products, has completed a new plant, 300 x 200 feet, on the Plum Creek branch of the Buffalo & Allegheny division of the Pennsylvania railway, near Verona, Pa. The structure is of steel and concrete construction, and the plant has a capacity of 100 tons a day, although it can be increased to 200 tons. The works are excellently located, having the advantage of shipping facilities, and there is a track running the entire length of the building.

The plant and property of the Mais Motor Truck Co., Indianapolis, Ind., have been sold by Receiver Franklin Vonnegut to F. H. Wheeler, Indianapolis, and W. H. Pearce and H. G. Francis, Rushville, Ind., for $71,000. The purchasers assumed a mortgage of $10,000. A new company, also known as the Mais Motor Truck Co., has been incorporated with a capitalization of $1,000,000. All the stockholders, except Mr. Wheeler, were stockholders of the old company. Creditors will receive 30 cents on the dollar, while stockholders get nothing. Claims amount to about $250,000, of which $85,000 will be liquidated.

The Ideal Steel Co., Cincinnati, has been incorporated with a capital stock of $500,000, to manufacture a patent steel automobile wheel, and will purchase a factory site and erect a plant in the near future. The following officers were elected at a meeting of the stockholders, which was held in Cincinnati, on Aug. 29: President, J. B. Fitch, who is also president of the Fitch Dust-Down Co., Cincinnati; vice president, J. E. Strietelmeier, who is the inventor of a new wheel; treasurer, E. H. Maffey; and secretary, B. L. Mattox. The board of directors was chosen as follows: J. B. Fitch, E. H. Maffey, W. R. Walker, William T. Wagner, J. E. Strietelmeier, Louis J. Dolle and H. E. Walker.

Trade Notes

The Pratt & Whitney Co., of Hartford, Conn., has received orders for large shipments of machinery which have been placed by officers of a large manufacturing plant near St. Petersburg, Russia.

The Halcomb Steel Co., Syracuse, N. Y., manufacturer of high speed, tool steel and special steels, has opened a sales office at 95 Liberty street, New York, in order to give more efficient service to its customers in that territory.

The Wrought Iron Range Co. has commenced to move from its present quarters, the block bounded by Nineteenth and Twentieth streets and Washington and Lucas avenues, St. Louis, and expects to be installed in its new plant, occupying 11½ acres at 5562 Natural Bridge road, before Sept. 15.

Fires

The Racine Steel Casting Co., Racine, Wis., sustained a loss of $10,000 by fire recently. The north end of the molding shops and part of the pattern shops and storage were burned. The buildings will be rebuilt immediately. Sixty men were thrown out of work temporarily.